ROYAL COMMISSION ON HEALTH SERVICES

MEDICAL EDUCATION IN CANADA

J. A. MacFARLANE,

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R. C. Dickson — Roger Dufresne
Harold Ettinger — John F. McCreary
J. Wendell Macleod

Publication of this study by the Royal Commission on Health Services does not necessarily involve acceptance by the Commissioners of all the statements and opinions therein contained.

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FOREWORD

In September of 1961, the members of the Royal Commission on Health Services decided that several studies should be undertaken under the aegis of the Commission's Division of Research, and that one of these should be a study of medical education. To make this study a group of six doctors was chosen, all with some experience in medical education and an interest in Canadian medicine as a whole. The group has had the continuous assistance of the medical consultant to the Commission. This Report, accordingly, is submitted to the Royal Commission on Health Services, and it should be clearly understood that the recommendations implicit in our conclusions are our own and not those of the Commission – unless and until the Commission accepts them.

We have circulated questionnaires, visited all the Canadian medical schools, examined new developments in medical education at Lexington, Kentucky, Gainesville, Florida, and Chicago, Illinois, in the United States; and at Edinburgh, Dundee, Sheffield, Birmingham, and London in the United Kingdom; at Stockholm and Umea in Sweden; Heidelberg, Germany; and Paris, France. We have discussed medical research in relation to medical education with the executive officers of the various government departments which have responsibilities in this field, and studied the main features of many briefs which have been presented to the Commissioners in their open hearings. We also visited Sherbrooke University and McMaster University, the former being in the midst of the establishment of a new school, and the latter being one which has given some thought to the establishment of a Faculty of Medicine.

We are very grateful for the whole-hearted co-operation and enthusiastic support of our colleagues in the medical schools, and acknowledge the help of the Association of Canadian Medical Schools. We appreciate also the hospitality and helpfulness that we encountered in our trips abroad. We are cognizant of the thought and care that have gone into the preparation of briefs to the Royal Commission, and we found the briefs presented by universities, and by national bodies with a direct interest in medical education, particularly helpful. Finally, we are extremely grateful to Prof. Blishen, the Director of Research of the Royal Commission on Health Services, who has found the time to attend nearly all our sessions. His help and advice have been indispensable to us. We would also express our sincere appre-

ciation to Mrs. Frances Ireland, and Mrs. Helen Roney, their editorial advice and counsel have been invaluable.

We have counted it a privilege to engage in this study, and present our observations and recommendations hereunder.

J. A. MacFarlane – Director
R.C. Dickson
Roger Dufresne
Harold Ettinger
John F. McCreary
J. Wendell Macleod

1964

CHAPTER 1

INTRODUCTION

MEDICAL EDUCATION TODAY

The Royal Commission on Health Services is concerned with all the professional and technological groups who assist in maintaining, restoring and protecting the health of the people. This report on medical education will be primarily concerned with the medical profession, that is, with the education of physicians. But the physicians do not work in isolation, and cannot be trained in isolation, from many other groups. The practice of medicine today involves close partnership with other professions working in the health field. Therefore medical education today must be constantly related to the education and training of an ever increasing cadre of workers who are associated with physicians in the provision of health services. Moreover, it encompasses the three fields of undergraduate, graduate and continuing professional education. The goal is not the mere absence of disease or infirmity but the more positive quest of the greatest possible degree of physical, mental and social well-being.[1]

For competent performance in this larger professional role, the education of the physicians entails more than the mastery of relevant portions of a great body of continually expanding knowledge and technical skills. It should aim also to inspire logical thinking, constructive attitudes and responsible behaviour. These qualities are best fostered by blending the spirit of scientific enquiry with deep concern for the welfare of humans, both as individuals and in the wider community. Thus modern medical teaching must be related to research on a wide front, ranging from investigation of the chemical nature of human heredity to the study of the influences that make for a healthy community. It is concerned even with the processes whereby individuals, institutions and societies may improve themselves so as to attain their fullest development.

The application of new scientific knowledge, especially in an era of accelerated social change, inevitably raises new and complex questions in professional ethics. The ethics of medicine must be concerned with the protection of society as well as of the profession, two functions which are increasingly difficult to harmonize as both medicine and society become more intricate. If this dual purpose

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[1] Adapted from definition in Preamble to Constitution of the World Health Organization, Geneva, 1948.

is to be fulfilled, then medicine must interpret and demonstrate its mission with unmistakable clarity. If it is to win and maintain the necessary support of society it should refine and enlarge its skills in the field of human relationships. More urgently than ever before, education for effective leadership in the health professions must lay the basis for keen perception and sound judgement in the social and moral values as well as the technical.

Historically, medical education has had both rich and lean phases. Its robust periods seem to have coincided with a sensitive and brisk reaction to challenge on one or more of three planes: (1) the general level of contemporary science and scholarship; (2) current perceptions of disease and medical practice; (3) the socio-economic and political climate of the times. It is proposed to examine the context of Canadian medical education today, to characterize the nature of its response to the challenges it faces and to draw conclusions relevant to its desirable future development. It should be helpful to see whence Canadian medical education has come and how its heritage may influence present performance and its capacity for change.

CHALLENGES FACING CANADIAN MEDICAL EDUCATION

The need to appraise Canadian medical education in the 1960's is pointed up by a series of challenges in the realms of general science, medical practice and society at large. These operational factors comprise the premises on which this report is based. They provide the themes also for much of the discussion in subsequent chapters. Society as a whole, general education, health and welfare services and professional training have all been subjected in this century to the swell of major movements. Three of these are particularly relevant: (1) the rapid growth of population and the great changes in our lifetime in the structure and role of the family and the community; (2) the staggering growth of scientific knowledge and technical skills; and (3) the social demand for greater security against hazards to the welfare of entire populations.

The nature of current social change and its implications for the related fields of health are discussed fully in the Report of the Royal Commission on Health Services. Many of the assumptions upon which our care of the sick and feeble have been based in the past are no longer tenable. Although many Canadians are aware of the burgeoning of the total population, particularly in certain age groups, few realize the rate and extent of the changes taking place in the size and economic base of the family, in the range of kin from whom backing may be sought in times of crisis, in the role of women who work outside the home, and in the early age of marriage. From 1941 to 1961, the proportion of brides who were under 20 years of age increased from 20.4 to 34.7, of grooms from 2.7 to 7.4. There is increased fertility in all levels of the child-bearing age. In 30 years from 1961 the population may well double itself (from 18,238,000 to 35,107,000). It is expected to reach 22,590,000 in 1971 (on the basis of a net immigration annually of 50,000), with a tremendous influx into high schools and colleges and a swelling of the age group that now overtaxes our facilities for chronic illness and infirmity.

Other changes present even greater challenges to our concepts of medical care and medical education. Chief among these is urbanization. Whereas city dwellers comprised only 37 per cent of the population in 1901, they were nearly 70 per cent of it 60 years later. Moreover, people move about more; family allowance figures show that, in 1961, one in four families changed residence, compared with less than one in five in 1948. The average dwelling is too small to accommodate elderly dependents in addition to the children, so that the total family unit tends to become smaller.

Not only is the family unit smaller, it is more mobile and has less permanent ties with neighbours and relatives. In other ways too, it has less stable moorings than before. Early marriage, a working mother and the expectation of a longer education for more of the children, are further features of today's society which influence attitudes towards health and steps taken to protect it. Urbanization draws young people to the city to seek careers and increases the tendency for them to live alone, without family attachments, domestic responsibilities or religious affiliations. Functions formerly performed by a larger family circle are being transferred to other types of social organization. Although this process solves certain problems inevitably it tends to create new ones, such as decline in the sense of individual responsibility. Instead of decrying these consequences of social change it is more useful to try to understand them and to promote constructive responses to the imponderable forces that produce them. This viewpoint is basic to the planning of sound education for the health professions.

More specifically related to medical education are the second and third of the major movements – the explosive increase in scientific knowledge and technical skills, and the public demand for health and welfare security for entire populations. While many benefits have resulted from the impact of these great forces, the following critical situations have arisen:

1. Technical progress, a two-edged sword: Scientific advance makes for greater complexity and specialization. Although there is public appreciation of benefits derived, there is also protest against the loss of personal touch and the increasingly mechanical tendency in much of today's medical care.

2. Public demand, public need and doctors: The satisfying of certain health needs is widely regarded now as a basic right. A more sophisticated public today is demanding a wider variety and, on the whole, a better quality of health services.

   Psychosomatic interdependence is recognized, and mental illness is losing its stigma. Facing a dazzling array of scientific advances in diagnosis and treatment the individual or family requires more than ever the guidance of a wise, sympathetic personal physician. At the same time, there has been growing criticism of, and some decline of confidence in, the profession as a whole.

3. The physician's burden: With powerful new tools at his disposal (drugs, surgery, etc.) the individual physician carries vastly greater responsibility than before. Not only is error today more costly and more readily discerned,

but criticism of an unfavourable result is sharper, even when undeserved. The conscientious practice of modern medicine is a rewarding personal experience for the physician but it is nearly always arduous and its stresses are often great.

4. New patterns of care: The great demands on the time and energy of those who would engage in single practice have led to the development of group practice. Further team-work with other physicians, and with the allied health professions and auxiliary personnel, may help considerably, but little experimentation in this direction is taking place.
5. Competition for personnel: There was a serious decline in the number of qualified applicants for admission to medicine in the mid and late 'fifties, and classes in several Canadian medical schools were not filled. Recognizing the length and cost of a medical course, may we expect that medicine will compete effectively with the attractions of industry and other sciences? In a talent-hungry world what is medicine's share of the talent in our high schools and colleges?
6. Hospital-centred teaching: Medical students are taught almost entirely by specialists, in hospitals where complicated cases are concentrated, and where the major emphasis is on critical episodes of illness rather than on a long-term maintenance of health. In recent years a startling proportion of graduates have embarked on training for specialty practice. Evidence will be cited of highly significant efforts being made to introduce "community medicine" into the core of the medical curriculum.
7. Innovation required: The gradual disappearance of the hospital "charity patient" is a gratifying result of social organization and of greater economic prosperity. It has made traditional methods of clinical teaching obsolete, and has forced medical schools and their teaching hospitals to work out new approaches to undergraduate education and particularly to advanced training in the clinical specialties.
8. Dilemma in research: Because the spirit and methods of scientific investigation are essential to good teaching, good learning and good medical practice, research is now a vital and integral part of medical education. Research ability, moreover, plays a major part in determining faculty appointments and promotions. Problems arise, since the teacher is encouraged to seek money for research from sources outside the university. The ardent investigator applies to, and receives from, granting agencies sums which, in total, may equal or exceed his teaching budget. Research requires time which competes with teaching duties. How to achieve a balance in emphasis on teaching and research is a matter of some urgency.
9. Financial difficulties: Medical education is an exceedingly costly experience for universities and for the hospitals affiliated with them for teaching. The higher teacher-to-student ratio of present-day instruction calls for large faculties. Increasingly complicated technical procedures and the admitting of patients to hospital for diagnostic studies add to the cost of facilities for

teaching. The indirect cost to an institution of research conducted by its staff is mounting steadily. Pressure is being exerted now to develop new medical schools in Canada. The cost of a good institution at this time, however, is so great that it is impossible for a university to embark unaided on such a venture.

Each of these issues presents a specific challenge to all who are responsible for or engage in medical teaching. Is the process of fragmentation of medicine proceeding faster than the corrective efforts towards integration which should be a goal of all education? Are the shortcomings of a largely hospital-centered curriculum being countered effectively? Is there a deliberate effort to produce physicians who will not only be competent technically but also sensitive to the more subtle needs of their patients? Will they include in their number those who will provide statesmanlike leadership for the future? Is the concept of team-work with other doctors, with members of the other health professions and with organized society being fostered adequately in the medical schools? Is an experimental attitude toward problems in all fields being demonstrated and encouraged? Will society provide the resources for the educational facilities needed?

These questions are raised at a time when all activities related to the common weal, one might even say all aspects of life itself, are being subjected to public scrutiny. At every level of society an enormous interest is being taken in the resources and methods whereby good health is sustained. More than ever before an appreciative but increasingly sophisticated and critical public is examining the work of the health profession to see if it is receiving the benefits of scientific advance promptly and in full measure.

In the main, this is a wholesome concern which the professions must understand and accept graciously. At the same time, the writers of this report believe that an indispensable part of such an appraisal of our arrangements for health care should be made by the health professions themselves. Physicians in particular are the ones best fitted to examine their own performance and judge whether it is up-to-date and according to the best standards that can be attained. Unless we do this systematically and competently, correcting deficiencies as they appear, we may forfeit the opportunity to guide the evolution of medicine in a wholesome direction. The mood of society today, if it encounters dereliction of duty on the part of those who render vital services, is to "take over". This might improve the efficiency of some parts of our present medical care arrangements but it could also stifle other developments of crucial significance, one of which deserves brief mention.

Repeated emphasis on new scientific knowledge and techniques sometimes gives the impression that this is the only important component of modern medical care. Allusion is made in the next chapter to "the art of healing" as a still essential element in modern medicine. A distinguished medical scholar and practitioner[1] has emphasized that the urge of man to heal and to comfort is a basic human trait, and that "the ailing are highly susceptible to the art of the healer, no matter what

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[1] Atchley, Dana W., "The Healer and the Scientist," *Saturday Review*, 37:7, Jan. 9, 1954.

his methods". He points out that the healer can offer his ailing fellow men much relief even when he does not understand fully the process of disease and cannot control it. The nature of this important interaction between human beings is barely understood but it is now the object of active scientific study. Several experiments in clinical teaching have been set up specifically to evaluate the "physician-patient relationship" and to learn how best to bring it into the learning experience of medical students.[1] This type of research deals with issues at the heart of the best kind of medical care. Scientific medicine practised in a perfunctory, impersonal manner turns out often to be a disillusioning experience. It is submitted that the search for the key to achievement of the proper balance between the art and the science of medicine is one of those subtle issues which might well get lost for decades if there was any major dislocation of the physicians' work. Here again the main burden of responsibility for systematic appraisal of its work lies at the doorstep of the profession.

A major premise on which this report rests is the belief that the universities must be concerned with the quality of performance of their medical graduates. They must accept responsibility, along with the professional bodies and licensing authorities, for the steps required to maintain competence in rendering medical care of high quality. Medical education is irrevocably committed to the advancement of its cognate sciences but its pursuit of this goal must be in the two-fold context of the system of higher education of this country and the over-all needs of its people.

At no previous time in history has there been such a ferment of interest in these issues on so wide a front — in education, in the health professions and in the discerning public. They have been listed at this point as blunt assertions or questions without documentation; most of them are presented more fully in later sections or in other reports to the Commission. Their relevance to the quality of health care for Canada in the future can hardly be denied. Their implications for medical education, as an essential instrument in achieving good care, will constitute the major topics of this report.

[1] See Chapter 2.

CHAPTER 2

PERSPECTIVES IN MEDICAL EDUCATION

GENERAL THESIS

In the world of health, as in most fields, the problems of the present are best understood in the context of the historical background. A common error is to regard modern medicine as consisting of only the firm bed of scientifically validated knowledge of the past century or two. It is, however, much more than this. Modern medicine is a complex of facts, skills, general assumptions and even folklore, united with an art of healing that stems from antiquity. In medical education, just as in medical practice, many problems defy solution if one forgets that "it is a matter of decades only since medical science attained enough stature to join with the art of healing in a mutually satisfactory way."[1]

At any point in history what a physician, or any other healer, has been able to accomplish has depended, in varying measure, on what society expected of him and of his tools of diagnosis and treatment. Similarly in medical education; what a faculty or curriculum can accomplish depends in some measure on the expectations brought by the student to his studies and on the expectations of the society that receives him later. Professional education becomes less realistic to the extent that it disregards the climate of opinions and assumptions in which the learner has grown up and the atmosphere and setting in which later he will work. The teacher too, in his attitudes and practices, will reveal the influence of his own background and of his current conditions of life and work. Only with such an eclectic approach will attention to the history of medical education cast much light on the problems of to-day. Scholarly guidance in this direction has been given by Sigerist and Shryock and their followers.[2]

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[1] Atchley, Dana W., *op. cit.*

[2] Sigerist, H. E., *A History of Medicine, Vol. 1, Primitive and Archaic Medicine,* New York: Oxford, 1951.
Marti-Ibanez, F., ed., Henry E. Sigerist on the *History of Medicine,* New York: MD Pub., 1960.
Roemer, M. I., ed., Henry E. Sigerist on the *Sociology of Medicine,* New York: MD Pub., 1960.
Rosen, Geo., *History of Public Health,* New York: MD Pub., 1958.
Shryock, R. H., *The Development of Modern Medicine — An Interpretation of the Social and Scientific Factors Involved,* New York: Knopf, 1947.

Still to be written is a history of medical education in Canada, or for that matter, the story of Canadian medicine itself, in which the events are sketched against the background of Canada's distinctively bicultural and political heritage and its socio-economic and geographical characteristics. Fortunately, for one who wishes to identify the cluster of circumstances that *probably* determined a particular course of events, it is not always necessary to obtain full historical documentation of the case before making a start. A fairly simple consideration of readily available evidence may cast light on a puzzling situation provided it be drawn from *all* relevant quarters. For example, a committee of a Canadian medical faculty engaged in curriculum revision may meet unexpected opposition to reduction of the hours of instruction in anatomy, and not only from anatomists and surgeons. Some of the opposition is very likely to be related to the genuine pride that Canadian medicine takes in its formerly intimate link with Edinburgh and Glasgow. This stemmed from the time when Scottish anatomy was the best in the world and when Scotland's distinction in surgery rested in good part on its scholarship in anatomy. Moreover, for about 300 years anatomy was the sheet anchor for science in medical studies. For a long time it was the only field in which objective verification of knowledge existed. Hence, understandably, the sacrosanct position of anatomy.

Similar connections with great eras of medical prowess link Canada also with London and Paris. In each case the passing of time has reduced the dependence of the Canadian on the older centre for his professional training. The warmth of sentiment persists however; partly because of continuing intellectual stimulus on many fronts, and partly because of the great significance of the relationship in the past. It is not hard to understand why at one stage in our history a Canadian seeking post-graduate study should find it easier to cross the Atlantic Ocean than Lake Ontario, or to go from Winnipeg to London rather than to Minneapolis or Chicago. Indeed, one of the satisfactions of a modern, liberal education is the better understanding of human behaviour. It is useful to realize that old loyalties may become attached to symbols and that it is normal human behaviour for intelligent persons to argue a point that has long since lost its validity.

Again from the sociological viewpoint, it is worth speculating about the effect on Canadian medical education of two striking features, one of history and the other of geography. The first is the considerable period of our colonial and near-colonial status. The other is the fact of being situated in the middle with respect to the three major powers that have shaped our history — Britain, France and the United States. It will be suggested later that Canadian patterns in medical education, as in some other walks of life, sometimes follow developments elsewhere after a lag of ten to thirty years. It will be charged also that innovation in Canadian medical education has been neither frequent nor original. Referring to a paucity of experimental approaches to problems in medical education in Canada, an officer of the Association of Canadian Medical Colleges attributed this to "hesitancy to accept what is new just because it is new, and a desire to wait until a new approach is proved to be valuable or else has been discarded."[1] Should this be true it would be important to

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[1] Thompson, J.S., "Medical Education in Canada", *Journal of Medical Education*, 34: 723, 1959.

learn whether the delay occasioned in adopting the good innovations exacted a price; and whether anything was lost by not being more actively engaged in experimental approaches. It would be well to ask too if instances of significant Canadian experience remained hidden because of failure to document and to publish. In any case, one could mention a number of distinctive Canadian accomplishments in the health field, e.g., universal hospital insurance in regional health service administration. The response of Canadian medical education to the former development may well comprise a noteworthy contribution.

LESSONS FROM HISTORY

The spirit of modern medicine was revealed first in the Hippocratic age in Greece. By 400 B.C. a long line of physician-teachers had acquired a wide reputation as consultants and scholars as they strove to free themselves from superstition and illogical theorizing. They emphasized accurate observation at the bedside, and wrote remarkable descriptions of what they saw and thought. Curiosity, open-mindedness and clear reasoning were so earnestly espoused by the Hippocratic physicians that they may well be included among the fathers of modern science. In to-day's language they practised "comprehensive medicine" in that they taught people how to maintain health, which they conceived as a state of balance, by means of hygienic rules of exercise, rest, diet and emotional control. Finally, their code of ethics protected their patients from malpractice and emphasized a lofty professional ideal.

One would think that this combination of competence and high-mindedness would have survived because of its obvious superiority over other traditions of healing, but this was not the case. By 200 A.D. all that was left of Hippocratic medicine was a dogmatic, encyclopaedic compendium of fact and fancy. Hippocrates was worshipped only in name and in the dogma expounded by those with access to the plethora of commentary on the Hippocratic writings of 500-600 years earlier. The spirit of open-minded enquiry and the idea of turning to the sick patient or to the world of nature for fresh evidence had disappeared, not to be heard from effectively again for a thousand years.

During the Middle Ages, in the monasteries, the manuscripts were recopied and preserved; medicinal herbs were grown; the ill and needy were treated with compassion and hospitals were founded. In the mediaeval universities the professors literally preached their lessons in medicine with inflexible authority. Learning on the part of the students was for the purpose of defending dogma at examination. For centuries academic medicine excluded the passing on of experience directly from practitioner to student.[1] An exception was at Salerno where Europe's first medical school flourished around 1000 A.D. It appears to have had an international lay faculty which included women. Surgery was practised and instruction in hygiene was an important activity. For the most part, however, no vital spirit returned to medicine until the Renaissance. It was the artists who turned attention again to the human body, Leonardo da Vinci becoming the first experimental anatomist in the modern tradition.

[1] Billroth, T., *The Medical Sciences and the German University*, Berlin: 1875, reprinted in 1924.

Perhaps the turning point for modern descriptive science was when the new professor of anatomy at Padua, Vesalius, charged that the orthodox teaching was seriously in error and turned to the evidence from dissection as the only real authority. His *De Fabrica*, published in 1543, along with the revolutionary work of Copernicus issued in the same year, marked the return of the spirit of open-minded enquiry so well established 2,000 years before. The prevailing intellectual climate, however, was inimical. Beset by criticism, and possibly budget troubles, Vesalius left the chair at Padua before he was 30 for the lucrative and protected post of physician to royalty in Madrid. Conflict among the anatomists themselves for the next century lends support to the view that *the forces in man and his society making for rigid conformity and intolerance may work in much the same way in any age*, whether in theology, politics or investigation of the ways of nature. The spirit is the same; it just changes its locale in human affairs.

What is the relevance to medical education of this excursion into history? It has been introduced to point up two related but superficially conflicting roles that medical education should play – to innovate and to preserve tradition. Now, more than ever before, medical teaching has to be dovetailed with large mass movements in technical research and in social change on a global scale. As this report will indicate, many of the older approaches are proving to be inadequate for new tasks, so the search for better methods is on. It would be well for all concerned with guiding the course of change in medical education to have the best possible understanding of the nature and consequences of *innovation*. Much can be learned from past history and from contemporary behavioural science about the causes of success and failure when initiating change. These resources in scholarship and experience are available in certain circles in universities but are also to be found well developed here and there in industry, in the teaching and legal professions and in government. It has not been easy for all medical men to look outside their group for help of this sort. One segment of medical tradition has fostered independent action, self-reliance and versatility – qualities essential to the healing role. This is being coupled now with a new tradition, one demanded by the specialization of knowledge and the complexity of modern society, namely, to seek consultation with experts in other fields, and to accomplish more and more by team-work. Medical education can best effect its necessary innovations by recognizing the existence and strength of the first of these traditions, and by working largely in the light of the second one.

This leads into the second purpose of the historical excursion, the role of medical schools in the perpetuation of traditions. The topic is dealt with vividly in a chapter on the sociology of medical education in a highly provocative report of studies carried out by social scientists.[1] Medical schools and their teaching hospitals cannot escape working with and being affected by the vast complex of professions, institutions, voluntary agencies and industries that have to do with maintenance of health. Indeed some of these links must be strengthened to correct

[1] Merton, R. K., Reader, G. G. and Kendall, P. L., *The Student-Physician: Introductory Studies in the Sociology of Medical Education*. Cambridge: Harvard University Press, 1957.

deficiencies in present educational practices. Nevertheless, a fair degree of autonomy is required by the teaching institutions if they are to serve the best interests of society in the long run. From time to time their long-range objectives may conflict with the desires of particular groups in the community. It is possible, too, for medical schools to develop "vested sentiments and interests" that run counter to the common good. How then is medical education to steer a course that will give it sufficient autonomy to ensure attainment of its academic objectives and at the same time be acceptable to the society that supports it? It is encouraging that these social scientists suggest that "the capacity for such functionally appropriate changes in medicine and medical education can be greatly reinforced by a great emphasis upon the traditions of medicine".[1]

Sociologists think of tradition ordinarily as "that part of a culture which is resistant to change, persisting for a time even when it is out of sorts with the newly emerging requirements of the society". Merton points out, however, that the social function of tradition depends on its content and in the case of medicine the great tradition has been the commitment to seek better understanding of disease and better ways to cope with it. The leaders of the past who are revered were, for the most part, men who advanced ahead of their fellows. "Every truly outstanding physician is in some degree a historian of medicine, taking pride and finding precedent in the values and accomplishments of the great physicians of the past." By setting the stage whereby young physicians identify themselves with this heritage, medical schools become "the guardians of the values basic to the effective practice of medicine..... It is their function to transmit the culture of medicine and to advance that culture .... their task to provide (the novice) with a professional identity so that he comes to think, act and feel like a physician .... their problem to enable the medical man to live up to the expectations of the professional role long after he has left the sustaining value-environment provided by the medical school".[2]

The viewpoint just presented relates the mission of medical education on the one hand to the wider interests and responsibilities of the community, and on the other, to the noblest vision and richest experience of the past. It points up also the urgent need for medical faculties to examine their objectives in this perspective and to assess the progress they are making towards them.

BACKGROUND OF CANADIAN MEDICAL EDUCATION

It is doubtful if problems of medical education dealt with in this report can be solved, or even fully understood, unless they are seen in the context of Canadian history and geography. Already mentioned as important factors are the strong loyalty to British and French traditions and the considerable period of quasi-colonial status. Reference will be made later to the relatively short and uneven course of development of higher education in Canada. It is not possible, however, to discuss the effect of

[1] *Ibid.*, p. 6.

[2] *Ibid.*, p. 7.

special features of Canadian economic history upon our medical schools, save to assert that when philanthropists were disposed to endow hospitals and colleges, the medical sciences were not sufficiently developed to attract similar support. Later, by the time medical science had won its place in the sun the taxation picture and the role of government had so changed that surplus wealth went in other directions. Finally, there is the fact of Canada's division into ten provinces, each responsible for much of its own development in the fields of education and health. As a result, stretched across a wide continent are 38 degree-conferring universities and colleges and 12 medical faculties, supported by a population of under 19 million. Between east and west coasts significant regional differences must be taken into account including the fact that three-quarters of Canadian medical students receive instruction in English and one-quarter in French. Nevertheless, the differences in medical education within Canada and between Canada and other countries are much less important than features shared in common. This is due in part to the similarity of tasks faced by the health professions and their educators the world over – an almost overwhelming increase in need and demand for services, and therefore for personnel, and the staggering proportions and complexity of the advances of science. The other cohesive influence is the rich medical heritage to which all have access and which all share in varying degree.

In medicine, perhaps more than in other fields, there is practical value in understanding the main outlines of one's lineage and the special contribution of its component parts. Only a sketch of this can be attempted in the present report, a few highlights to suggest the kind of atmosphere in which Canadian medical colleges have grown up. This should provide also the setting in which to depict, in the final section of this chapter, the current movements in medical education which impinge on our present institutions. It should help us to identify the trends of vital relevance to any expansion of medical education which Canada may plan for the future.[1]

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[1] The historical portion of this section is an impressionistic rather than closely documented account. The following references have been helpful although agreement between them has been often incomplete.

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The evolution of modern medicine may be recounted in a variety of ways. One can list, for example, the series of technical developments over the centuries that were of benefit to human life; or the basic scientific discoveries that made them possible. The story can be told also in terms of the bursts of intellectual ferment that lay behind specific advances. In the latter case one deals with modes of thought, patterns of activity and movements, with the centres of human enterprise that fostered the ferment, and with the individuals who led or epitomized the new ideas or methods. By this approach one may relate Canadian medicine and medical education to the main stream of scientific thought of the Renaissance by way of several connections. For example, a heritage in scholarship can be traced from Hippocratic medicine in the Eastern Mediterranean through Salerno, to Montpellier, Padua and Paris, thence to Quebec and Montreal. This was not a simple, direct line; there were many collateral routes as when the Arabian elaboration of Greek medicine was transmitted by Moorish physicians to Cordova and on to Bologna and the other universities of the present Italy and France. Despite wars and difficulties in travel there was for long periods of time a well-worn network of traffic which later tended to become two-way between the cities mentioned and new foci of learning at Leyden, the Germanic cities, Edinburgh, London and Dublin.

Canada has another link with outstanding examples of the best university medicine of their times by way of Leyden, Edinburgh and the Johns Hopkins in Baltimore. Among other things this concerns the battle between the oratorical lecture bequeathed by the mediaeval university and bedside teaching. The latter was based upon what teacher and student could learn from observing and reflecting on the actual manifestations of illness in the patient. The struggle is not yet entirely resolved. Clinical instruction, although demonstrated earlier in Padua,[1] was founded properly in the new University of Leyden in the 1600's and reached its zenith in the early 18th century under Boerhaave who used not only his relatively small number of teaching beds effectively, but also the museum, the botanical gardens and what could be called the first university laboratories for medical science.

Boerhaave's students were directly responsible for the flowering of university medicine in Edinburgh, Göttingen and Vienna. Of great interest to us today, the success of Edinburgh has been ascribed to the inspiration of Boerhaave on two scores – "The enthusiasm of its early teachers, and the concentration of all the medical teaching, both clinical and subsidiary, in one great university school".[2] Edinburgh in turn, was one of the chief sources of stimulus to the physicians and surgeons responsible for the beginnings of medical schools in Montreal and Toronto and, somewhat earlier, in the American colonies. It has been claimed indeed that clinical teaching of the Leyden-Edinburgh type crossed the Atlantic in two thin streams to McGill and Pennsylvania to be united by the

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[1] Puschman, Theodor, *A History of Medical Education from the Most Remote to the Most Recent Times*. Leipzig, 1889. Translated by Evan H. Hare, London, H.K. Lewis, 1891. Reprinted by University Microfilm Inc., Ann Arbour and London, pp.332–333, 410 *et se.*

[2] Singer, Charles, *A Short History of Medicine*, Oxford: Clarendon Press, 1928, p.142.

Canadian, William Osler from Toronto, who left McGill in 1884 to be professor of medicine at Pennsylvania. Five years later Osler founded the department of medicine at the new Johns Hopkins Hospital and University in Baltimore.

The history of Padua and Leyden has been repeated at Hopkins where American, British and German scholarships combined to establish a new standard of university medicine and to attract scholars from around the world. Physicians trained at Hopkins or at university medical centres following the Hopkins pattern have made a notable contribution to Canadian medical education. Curiously enough, the movement of scholarly leaders completed the circle when Osler became Regius Professor of Medicine at Oxford in 1904. This was a little more than 500 years since the Oxonian, Thomas Linacre, left to study and browse in medicine at Bologna, Florence and Rome. On his return he taught Greek at Oxford, was a court physician through three reigns and founded the Royal College of Physicians of London. The lore of medicine is no one nation's property; the centre of gravity of scholarship migrates; and scholars sooner or later find their way to those places where excellence and relevance prevail.

In Canada, the medical needs of the settlers during the French regime were met largely by army surgeons, and this continued to be the case with the British after 1763. The practice of medicine was regulated in Quebec, however, from as early as 1660. From 1783 the influx of United Empire Loyalists included a number of physicians, most of whom had been attached to the military forces. In 1788 a medical licensing Act was passed in the British Parliament which required registration for the practice of physic, surgery or midwifery in Montreal or Quebec. An examination board was established in Quebec by the Governor since this was an era when fraudulent and inexperienced doctors abounded.

Virtually all physicians in the Atlantic seaboard colonies had learned their craft by apprenticeship but from early in the 18th century many of them crossed the ocean to visit the hospitals and attend lectures of the professors in Leyden, Paris, London and Edinburgh. A desire to teach was a natural sequel to this experience; consequently, as early as 1756 classes were held in Philadelphia and nine years later the medical school was started at the College of Philadelphia, soon to become the medical faculty of the University of Pennsylvania. Three famous first professors, Morgan, Shippen and Rush, were all graduates of Edinburgh; one of them also of Princeton. They were reared in the vigorously intellectual climate described by their fellow-citizen Benjamin Franklin and they had studied abroad under such giants as the Monros, the Hunters and Cullen. As F. H. Garrison wrote, "The War of the Revolution was the making of medicine in this country". The professors were drawn into public service; Morgan and Shippen to be Surgeon-General in turn, and Benjamin Rush to be Treasurer of the Mint for 14 years. Of the 87 medical schools in the United States in 1962, four were founded prior to 1800 (Pennsylvania, Columbia, Harvard and Dartmouth), 19 more by 1850 and another 31 by 1900. The whole country participated in an enormous expansion.

Canada enjoyed no counterpart to the stimulus of a crusade for independence. Indeed it has been mentioned recently that three important components of early

Canadian society had all experienced reverse in one form or another – the French on the Plains of Abraham in 1759; the Highland Scots in the final defeat of the Jacobite cause 14 years earlier and the destruction of the clan system; and the United Empire Loyalists in having to leave their homes in the American colonies following the collapse of British arms.[1] Be that as it may, it is an undoubted fact that the World Wars of 1914–18 and 1939–45 had an extraordinarily invigorating influence on medical teaching and in the second instance on research. In general the course of medical education in Canada has undoubtedly been influenced by the smaller population, the much later development of industry and of large cities, the smaller per capita income and certain features in the development of higher education in Canada to be mentioned later.

Medical teaching began in 1824 at the Montreal Medical Institution which became the Faculty of Medicine at McGill University five years later.[2] Dr. John Rolph began lectures to 12 students in St. Thomas in 1824 but his school closed after two years. He resumed teaching in 1843 at the Toronto School of Medicine which had to compete with King's College, later the Medical Faculty of Trinity College; finally, after still further changes, their union led to their becoming a faculty of the University of Toronto. In 1887 it was joined by the Medical Faculty of Victoria University.[3] Meanwhile, a bilingual school had been established in Montreal in 1843 as l'École de Médecine et de Chirurgie de Montréal, the precursor of the faculty at l'Université de Montréal. Quebec City's origin as a medical centre began with the founding in 1639 of Hôtel-Dieu. Teaching by apprenticeship was well established early in the 19th century and some classes were held as early as 1823. Teaching under the auspices of l'Université Laval began in 1853. The first stages of medical faculty development for Queen's University began in 1854; for Dalhousie University in 1868, and in 1881 for the University of Western Ontario. Most of these began as proprietary enterprises with espousal by the university coming later. When the Manitoba Medical College was founded in 1883 it stood out squarely for a four-year course preceded by two years of preparation in the university, and a degree to be granted by the university. Standard instruction in university faculties of medicine began in 1913 at Alberta, in 1926 at Saskatchewan, in 1945 at Ottawa and in 1950 at British Columbia. The dates of organization of Canadian medical schools are given in Table 2-1, along with the size of the first-year class in 1962-63.

Canadian medicine as a whole, including the young medical schools, benefited throughout the 19th century from frequent contact with the substantial

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[1] MacLennan, H., *McGill, The Story of a University,* 1960. London: Allen and Unwin Ltd., p.27.

[2] The Montreal General Hospital was opened for patients on May 1, 1822. On October 7, Dr. John Stephenson gave an introductory lecture at the hospital. In the following year a faculty of four graduates of Edinburgh University presented an organized course of lectures supplemented by clinical teaching in the wards. (See Heagerty, *op. cit.* and MacDermot, *op. cit.*, the latter paper being the most useful account of the beginnings of medical education in Canada and its North American setting.)

[3] See also Farquharson, R.F., "Medical and Dental Education in Canadian Universities" in *Canada's Universities in a new age, Proceedings of the Conference held by the National Conference of Canadian Universities and Colleges,* Ottawa, Nov. 13–15, 1961. Ottawa: Le Droit, 1962.

TABLE 2–1

STATISTICS ON TWELVE CANADIAN MEDICAL SCHOOLS, BY REGION, WITH DATE OF ORGANIZATION AND ENROLMENT IN FIRST YEAR, 1962–63.

Region and University	Year organ-ized	First Year enrolment in 1962–63
Atlantic Region		
1. Dalhousie University, Faculty of Medicine, Halifax, N.S.	1867	71
Quebec		
2. Faculté de Médecine, Université Laval, Québec	1852	133
3. Faculté de Médecine, Université de Montréal, Montréal	1843[1]	126
4. McGill University, Faculty of Medicine, Montréal	1829	112
Ontario		
5. University of Ottawa, Faculty of Medicine, Ottawa	1945	71
6. Queen's University, Faculty of Medicine, Kingston	1854	59
7. University of Toronto, Faculty of Medicine, Toronto	1843	175
8. University of Western Ontario, Faculty of Medicine, London	1881	60
Prairie Region		
9. University of Manitoba, Faculty of Medicine, Winnipeg, Man.	1883	70
10. University of Saskatchewan, College of Medicine, Saskatoon, Sask.	1926	40
11. University of Alberta, Faculty of Medicine, Edmonton, Alta.	1913	78
Pacific Region		
12. University of British Columbia, School of Medicine, Vancouver, B.C.	1949	62
Totals		1,057

[1] See text. L'Ecole de médecine et de chirurgie de Montréal had affiliation with McGill University in 1847 and with Victoria University of Cobourg in 1867. In 1891 it was united with the medical faculty established by l'Université Laval, Quebec, 12 years earlier. In 1923 this became the medical faculty of l'Université de Montréal which had received its Charter in 1920.

Source: Records of Association of Canadian Medical Colleges.

medicine of Paris and the other French centres, and with London, Edinburgh, Glasgow and Dublin. French medicine was highly erudite. The refinement of skills in physical diagnosis and the insistent correlation of clinical features with the findings in the laboratory and post-mortem room placed the French hospitals in the forefront of academic medicine, certainly for the first two-thirds of the century. In London a great teaching tradition had grown up in the wards, operating theatres and out-patient departments of the famous hospitals on which its medical schools were based. It was also Dublin's Golden Age for clinical medicine and obstetrics. The role of Edinburgh has been mentioned already. Canadian students and post-graduate physicians who toured and even haunted these centres returned to teach a brand of medicine and surgery that was illumined for most of this time by the best theory of the day securely grounded in a clinical tradition that was unexcelled.

The devotion to British and French medicine in the 19th century was related also to the practical needs of the two main cultural groups spread out in a thin line of small communities. Self-preservation was of paramount concern. Bishop Strachan declared in 1826 that it was melancholy to think that more than three-quarters of the practitioners in Upper Canada at that time had been educated or had attended lectures in the United States and "it is presumed that many are inclined to that country". Governor Simcoe pointed out to the Colonial Office in London that he wanted to start a university in Toronto "if only to counteract the seditious influence of Harvard".[1] This allegiance had its rewards but when protracted it had its disadvantages also as must now be recounted.

Medical historians have come to say, with respect to the advance of the science of medicine, that whereas the first half of the 19th century belonged to France, the second half belonged to Germany. Certainly after 1870 the focus of scientific interest shifted to the German universities where the intensive, well-subsidized study of every aspect of disease was carried out by full-time university teachers in laboratories, wards and clinics, all integrated around teaching and research. This was the climate that stimulated many who later became scientific leaders in Britain, on the continent and later in the new departments of American universities, notably at Johns Hopkins. The extent to which Canadian development may have been restricted by the persistence of a degree of provincialism does not appear to have been studied. Apart from Osler, and such pathologists as Adami, MacKenzie, and a very few of their contemporaries who visited extensively and repeatedly the best known German laboratories, there seems to have been little first-hand contact in the 19th century between Canadian medicine and German medical research. Somewhat later came the trek to the specialty clinics of Vienna, Budapest and Berlin, but this was on another plane and had limited influence on basic medical education.

This period coincided also with a lull that followed the rapid expansion of higher education in Canada in the 1850's. "The position of higher education in

[1] Gibson, W.C., *The Financing of Early Medical Education in Canada*, 1957, (unpublished).

Canada in 1860 is impressive, far in advance of any other British colony and comparable to the offerings in the United States and Great Britain. The curricula were more liberal and flexible than Oxford's or Harvard's, many of the professors were engaged in serious research, and the organization of sound secondary schooling was beginning to provide a supply of well-prepared matriculants. But by 1890 the Canadian institutions had fallen behind a reformed Oxford, a revitalized Harvard, an expanded London, while Canada had nothing to compare with such new establishments as Johns Hopkins, M.I.T. and Cornell''.[1] The lull has been attributed to the inability of either the state, the denominational institutions or the condition of Canadian industry to provide an adequate financial base on which to expand the colleges and universities. Whatever the cause, this state of affairs must have had some influence on the rate and direction of growth of the Canadian medical schools up to 1910. This date, as will be explained, may be regarded as *the beginning of a new era in medical education in North America in which all of teaching and research would aspire to performance according to the best standards of the university;* a process by no means complete in all respects yet.

A university pattern of medical education was taking shape in America in the latter half of the 19th century. The University of Michigan offered standardized courses in 1850, placed its teachers on salaries and in 1869 renovated one of its buildings to serve as its own hospital. In the same year President Eliot at Harvard demanded reorganization of medical teaching on a firm university footing. Pennsylvania founded the first full-fledged university hospital in 1874. Chicago and Syracuse could also be included in the small list of medical schools reformed to reach medicine on a university basis. Finally, in 1884 came the founding of the medical faculty at Johns Hopkins University, seven years after its trustees authorized John Shaw Billings to examine the trends in medical education and draw up plans for the hospital. The latter was opened in 1889 and the medical school in 1893. Before the century closed it was gradually becoming clear, except to those with vested interests in the old order, that medicine henceforth should be taught only as a university discipline. This meant high matriculation standards, an organized curriculum, a regularly appointed permanent faculty, and laboratories linked with a hospital service devoted to teaching and research (rather than to the private practice requirements of clinical teachers); and also, of great practical importance, it meant an adequate financial endowment. These conditions were being approached, and in several instances attained, in only a fraction of university centres in North America. (These included the faculties of medicine at McGill and Toronto.) What about the others, about 150 at the turn of the century? It was the spectacle of this group that led to action, to decisive steps that exerted a momentous influence on medical education in North America and overseas.

In little more than a century, the United States had produced nearly 450 medical schools, "many, of course, shortlived, and perhaps 50 still-born",[2] most

[1] Harris, Robin S., "Higher Education in Canada," *The Dalhousie Review*, 42:423—436, No. 4, 1962, (page 428).

[2] Flexner, Abraham, *op. cit.*, p. 77.

of them of poor quality. Whether measured by standards of admission, length and character of curriculum or qualifications of their teachers many were little more than "diploma mills". The American Medical Association was formed in 1847 primarily to raise the standards of preparation for medicine. The Association of American Medical Colleges was established in 1876 to standardize instruction, with little early success, it must be admitted. In 1905, the AMA formed its Council on Medical Education and speeded up the visitations at medical schools begun a few years earlier by the AAMC. The schools were classified on a merit basis by the AMA as early as 1907 but it was soon realized that comformity to higher standards would not be achieved unless supported by public opinion, armed with the findings of an impartial survey. The Carnegie Foundation for the Advancement of Teaching responded to the approach of the AMA and appointed Mr. Abraham Flexner to accompany Dr. Nathan Colwell, Secretary of the AMA's Council on Medical Education, on a survey of all the medical schools in the U.S.A. It included also those of Canada. The so-called Flexner Report,[1] issued in 1910, exceeded all expectations in its influence to "clean house" and to accelerate the growth of great university medical centres.

The Flexner Report was strikingly effective in two directions. In the face of appalling shortcomings disclosed, many schools felt compelled to dissolve. In other cases they joined forces to produce a single strong institution. In 1915, within five years of publication of the Report, the number of schools had been reduced from 156 to 95. By 1927, the count was 80, of which 62 were fully approved.[2] An even more important effect, however, was the positive influence on criteria for admission to medical studies, on standards of curriculum, on qualifications of faculty and on the size of the supporting budget. These changes were incidental to the new movement to convert medical education from apprentice training given largely by practitioners, to the new concept of its being a full-fledged university discipline. Not only should the basic sciences be taught, according to the Report, by full-time scientists striving to advance knowledge in their fields, but by implication the clinical subjects would also be taught by scholarly physicians who could "devote themselves to their hospital wards precisely as the physiologist and anatomist devote themselves to the laboratory". Full-time teachers in medicine, surgery and obstetrics had not been proposed in the Report but such arrangements followed as a necessary corollary. It required another study by Mr. Flexner to produce the evidence that would persuade Americans and Canadians to place clinical teaching on a university basis.

In 1912, following an extensive survey of medical education in Britain, France, Germany and Austria, Flexner reported to the Carnegie Foundation on what he had seen.[3] While each country displayed distinctive strength in certain respects,it was from German experience that Flexner found most to learn. Their universities had complete control of the staff appointments and conduct of the

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[1] Flexner, Abraham, *Medical Education in the United States and Canada*, A Report to the Carnegie Foundation for the Advancement of Teaching, (Bulletin Number Four), New York, 1910. For further discussion see Chapter 6, The Teaching Hospital.

[2] Johnson, V., *op.cit.*, p. 11.

[3] Flexner, Abraham, *Medical Education in Europe*, A Report to the Carnegie Foundation for the Advancement of Teaching. (Bulletin Number Six), New York, 1912.

hospital where its teaching and research were conducted, even though the hospital might be owned by another authority. Teachers were professors, not practising physicians. Clinics and laboratories were closely related and research was held in high esteem. Many years earlier, full-time arrangements in a proportion of the clinical posts had been advocated by individual members of the Hopkins faculty. It was Flexner's second report, however, that induced the Rockefeller Foundation to enlist his help in negotiating with The Johns Hopkins University for the establishment of full-time professorships in the clinical departments. Faculty objections were resolved eventually and in 1913 an endowment from the Foundation permitted the plan to go into operation.

The three decades beginning in 1910 witnessed an extraordinary leap forward in scientific medicine and in the institutional setting for a new quality of medical education. In that year the Hospital of the Rockefeller Institute for Medical Research was opened in New York, destined to train successive generations of leading medical scientists, including several who became professors in British and Canadian universities. In 1910, cut to the quick by Flexner's visit the year before, Washington University in Saint Louis reorganized its faculty on a basis of scientific scholarship and worked out an affiliation with a new teaching hospital in which a high standard of care of patients would also serve the interests of teaching and research. Six years later, in 1916, full-time professors were appointed in medicine, pediatrics and surgery, each department becoming a veritable hatchery for future scientific leaders in these fields. What may be called the Hopkins pattern was adopted widely, particularly in the decade following World War I. Old schools underwent rebirth as at Columbia, Cornell, Iowa, Vanderbilt and Yale, to name only a few; new schools along entirely fresh lines were established as at Rochester, N.Y. and Duke.

This extraordinary development depended on more than the vision of scholars; and the presence of models to emulate. It would have been impossible without the leadership given by an interested, responsible and farsighted citizenry and the availability of wealth. Or special significance was the response of university presidents, trustees, civic leaders and philanthropists to the challenges of need and of opportunity. Between 1919 and 1928, the General Education Board, created by Mr. Rockefeller in 1902 and operating with less than fifty million dollars, added either directly or indirectly half a billion dollars or more to the resources and endowments of American and Canadian medical education. The value of the financial aid was greatly enhanced by the strong sense of social purpose of Carnegie and Rockefeller and by the sound guidance offered by the men who staffed their foundations. The latter role has been observed again in 1950-1960 when significant experiments in medical education were fostered by foundations.[1] This role of leadership in the process of develop-

[1] Canadian medical colleges and teaching hospitals have benefited particularly from grants awarded by the Commonwealth Fund, the John and Mary Markle Foundation, the Milbank Memorial Fund and the Rockefeller Foundation, all of New York City; the W. K. Kellogg Foundation of Battle Creek, Michigan; and, latterly, the Samuel R. McLaughlin Foundation of Toronto. Other foundations whose awards are restricted to certain provinces or interests have also given substantial aid. Among their recent officers whose critical advice enhanced greatly the value of the awards have been Frank E. Boudreau, Lester J. Evans, the late John B. Grand, Alan Cregg, M.R. Kinde and R. R. Struthers.

ment should be borne in mind as Canadian educational enterprises seek further support from the private and public resources of Canada.

Turning to our own country it is natural to ask this question: what was the impact on Canadian medical education of Flexner's survey and of the developments just described? This is how Flexner summarized what he saw in 1909:

> "In the matter of medical schools, Canada reproduces the United States on a greatly reduced scale. Western University (London) is as bad as anything to be found on this side the line; Laval and Halifax Medical College are feeble; Winnipeg and Kingston represent a distinct effort toward higher ideals; McGill and Toronto are excellent. The eight schools of the Dominion thus belong to three different types, the best adding a fifth year to their advantages of superior equipment and instruction .....The future of Queen's depends on its ability to develop halfway between Toronto and Montreal, despite comparative inaccessibility, the Ann Arbor type of school."[1]

Certain reforms followed rapidly. The Halifax Medical College went out of existence in 1911 as Dalhousie University re-assumed full responsibility for the medical faculty. Full-time chairs in anatomy and physiology were established at once and others followed shortly. Grants from the Carnegie and Rockefeller Foundations in 1920 permitted a vigorous building programme. A representative of one of the Foundations stated that the President and Board of Dalhousie "could lay more stone and mortar and create more educational facilities with fewer dollars than any other such group in America"![2] In London, Ontario, the medical school was placed squarely under university control in 1913 and full-time paid professors were appointed in several of the basic science departments. A good medical school building was erected in 1921 opposite the Victoria Hospital. Similarly in Winnipeg, a full-time professor of anatomy was appointed in 1910 and eight years later the Manitoba Medical College became the medical faculty of the University of Manitoba. Again, a Rockefeller grant permitted the construction of new facilities in 1921 and enlargement of the basic science staff. Within the decade, standard facilities for teaching the medical sciences were in use in all Canadian medical schools.

Up to this point the post-Flexner story in Canada parallels, on the whole, the development in comparable colleges in the United States. When one looks at the clinical departments, however, there has been a decided difference. The first full-time professorship, established in a clinical subject in Canada, indeed in the entire British Commonwealth, was the chair in medicine at the University of Toronto at the end of World War I, to be followed in 1921 by a similar chair in surgery. Chairs in these subjects were established at Queen's University in 1920. At McGill University in 1924 a full-time professorship was established in the Department of Medicine, the tenant also to be Director of the University Clinic at

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[1] Flexner, Abraham, Bulletin Number Four, *op.cit.*, pp. 325 and 150. He pointed out also, however, that "In Canada conditions have never been so badly demoralized as in the United States. There the best features of English clinical teaching had never been wholly forgotten", p.13.

[2] Atlee, H.B., "Dalhousie Medical School, 1907—1957", *Dalhousie Medical Journal*, XI : 21—33, 1958, p. 23.

the Royal Victoria Hospital. In most instances, research laboratories were established adjacent to the teaching wards, staffed by competent research teams. Thus a notable group of scientifically oriented physicians and surgeons received training and important additions to basic medical knowledge were made. Similar facilities for teaching and investigation were developed early in the Montreal General Hospital and in the Hospital for Sick Children, Toronto; and in almost all the major teaching hospitals there was a considerable growth of interest in clinical investigation in the two decades between the world wars. Nevertheless, the full-time movement in clinical fields made little further headway in Canada until after World War II, from 25 to 40 years after its establishment at Hopkins, at Washington University and at a dozen other American medical schools. Not only did the system fail to spread appreciably to other medical schools, or to other departments at these universities; it was not being pressed within the very departments that had led in gaining full-time heads in the early 1920's.

The situation was not to change significantly until after World War II, but by 1953-54 there were 57 full-time teachers in Canadian clinical departments and by 1961-62, 391 teachers in these categories.[1] This indicates fairly general acceptance of the principle of a core of full-time teachers in the clinical disciplines. Similar acceptance has come also in Britain[2] and in France.[3] It is natural to ask why a vibrant, forward movement in medical education should take so long to stir Canadian institutions to more than token action when they lived in close proximity to vivid models of the new development. Why did some of the great events foreshadowed by Flexner's survey in 1909 take place no earlier in Canada than in Britain and France? Serious study of these questions is beyond the scope of this review but several observations may be made to arouse interest; or even to foster research on the problem of what determines the character and rate of growth of Canadian institutions. Few matters can be more important than to learn from past experience how to plan for the future.

The issue is whether Canada's delay in completing the process of putting medical teaching on the "university basis" has been due primarily to economic circumstances, to earlier entry into World War I than in the case of the United

[1] Data for 1953—54 are derived from "Annual Report on Medical Education", *Journal of American Medical Association* 171:1507, November 14, 1959. Table 18. Data for 1961—62 are from questionnaire returns to Royal Commission on Health Services, Canada, 1962.

[2] *Report of the Inter—Departmental Committee on Medical Schools*, Chairman, Sir William Goodenough. London: His Majesty's Stationery Office, 1944. The Committee recommended to the Ministry of Health and the Department of Health for Scotland that "in harmony with the general body of evidence" the staff of every medical school should include whole-time professors in medicine, surgery, and obstetrics and gynaecology; probably also whole-time senior staff in child health, social medicine and anaesthetics; and in all clinical departments a number of whole-time appointments in the intermediate and junior grades. The University Grants Committee Report on University Development, 1947—52, stated that 55 new whole-time chairs had been created in British clinical departments; and much growth has taken place since then.

[3] In France, an Inter-Ministerial Committee for the study of problems in Medical Education in Hospital Organization, and in Health and Public Welfare, was created in 1956 under the chairmanship of Professor Robert Debré. Implementation of the Debré Report has led to the integration of teaching, research and patient care in the new "Centres Hospitaliers et Universitaires" by means of full-time clinical teachers. Bernard, Jean and Dausset Jean, *Reforms in French Medical Schools*, Education in France, 21:7—14, May 1963. Cultural Services of the French Embassy, FACSEA, 972 Fifth Ave., New York 21.

States, to the retardation in expansion of higher education in Canada in the later 19th century as already described,[1] to some kind of cultural or ideological lag or to other factors still to be identified.[2] Canada's limited contact with German medical research during the 50 years prior to World War I has been mentioned. One has the impression that Canadian biologists, chemists and physicists travelled more widely than the physicians and surgeons.

It is interesting to examine the biographies of the 19 members of the first Council of the Royal College of Physicians and Surgeons of Canada, organized in 1929.[3] Eighteen graduated between 1887 and 1906, all but one from Canadian medical faculties. Twelve had pursued at least one year of post-graduate study outside of Canada; four spending two or more years in France and eight spending one or more years in Britain or on the Continent. Despite the intellectual ferment in the avant-garde institutions of the United States only two of the 19 studied in that country; but they did so for a substantial period of time, six years in one case and, in addition, had further years of experience in scientific work in Britain and on the Continent. These were the two men selected to fill the first full-time clinical chairs in departments of medicine in Canada.

Many of the juniors of these two professors in the 1920's and 1930's had further training in medical research in American university centres, as well as in laboratories in Britain or on the Continent; but they generally returned to part-time teaching posts in which the responsibilities of medical practice encroached on their time for research. During these decades there was abundant contact by the basic medical scientists with the American centres, and by clinical specialists with their opposite numbers by means of the American College of Physicians, the American College of Surgeons and many specialty societies. There is every reason to believe that Canadian medical scientists were active and fruitful on the front line of research and that the clinical teachers were up-to-date and competent in their specialty crafts. It is curious that the two groups were unable to bring back the organizational pattern for the medical school and teaching hospital that would give pre-eminence to scientific pursuits and would foster the utmost in interdisciplinary research. The question is whether the difficulty resided mainly in the slow development of the financial support and physical facilities for research in Canada, or in some kind of psychological blindspot within themselves, or in limitations in the administrative structure or atmosphere of the hospitals and universities to which they returned. No answer is attempted but certain comment may be made.

Receptivity to new ideas is a necessary requirement for research; it should also be one of its by-products. To what extent medical education has moved more slowly in Canada because of the comparatively recent development of research as

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[1] Harris, Robin, *op. cit.*

[2] It would be interesting to examine the impact made on Canadian thinking and decisions by Osler's opposition to the full-time principle in clinical appointments. See Osler, Sir William: "On Full-time Clinical Teaching in Medical Schools," *Canadian Medical Association Journal*, 87:762–765. This contains the famous letter written by Osler from Oxford to President Ira Remsen, The Johns Hopkins University, Baltimore, dated September 1, 1911.

[3] Lewis, D. S., *op. cit.*, pp. 189–207.

an essential element in university life is an imponderable question. Progressiveness in scholarship in the modern university may be measured also by the state of graduate studies. In 1902 the President of the Royal Society of Canada contrasted the research activities of the universities of Germany, Britain and the United States and said: "Organized research in Canadian universities can scarcely be said to exist as yet, although within the last decade certain beginnings have been made which indicate a movement in that direction."[1] During the first decade of the present century all graduate studies at the doctoral level and nearly all at the master's level were confined to McGill University and the University of Toronto. Yet as late as 1934 a distinguished scholar presented the following view to the National Conference of Canadian Universities:

> "Dean Brett of the University of Toronto maintained that there were really few posts for PH.D.'s in Canada – too few to justify a large graduate enterprise. He confessed that Toronto and McGill did not regard doctoral work as an objective which they should strive for, but were rather having it forced upon them. They were, he said, employing a temporizing policy in the sense of encouraging graduate work by accepting suitable candidates and yet hoping to evade the liability which every graduate student created. While the demand for specialized instruction increased, the over-worked teacher became steadily less a specialist. Dean Brett doubted whether many of the staff were in any significant sense graduate-minded. On the contrary, in their hearts they felt that it was enough to give Canadians a good education and then to let them go to American or European universities for graduate study. Of course they did not like to advertise that attitude."[2]

The first Ph.D. degrees were awarded at Toronto and McGill respectively. Queen's, Manitoba and Laval followed in 1925, 1928 and 1931; but all other doctoral programmes in Canada have matured since World War II. Whether this slow pacing of the growth of graduate studies and of related research is more the effect than the cause of the rather late development of governmental support of research in the universities, is problematical. In any case, from the standpoint of fostering an atmosphere in the university conducive to experimentation with new approaches, whether in the proper realm of science or on questions of education, it will be necessary to create the circumstances that will lure the open-minded, inventive scholar to responsible roles in our institutions. If this is not done, then the departments will be staffed by those who are less interested in exploring either electrolytes or educational objectives and methods. In summary, although it cannot be proved, *it is suggested that the retarded reaction in Canada to some of the crucial implications of the Flexner Report*[3] *is due to a variety of factors: economics; the "drain of brain" to more advanced, more dynamic centres; and a complex of historical and cultural influences which have served on occasion to deflect attention from the areas of greatest intellectual ferment.*

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[1] Loudon, Jas., quoted by Thompson, W.P., *op. cit.*, p.3.

[2] Thompson, W.P., *ibid.*, p.15.

[3] This refers to Flexner's first report, *Bulletin Number Four. Bulletin Number Six, op. cit.*, though equally significant for medical education in this country is seldom mentioned in Canadian discussion. The same is true of Abraham Flexner's *Medical Education – A Comparative Study*. New York: MacMillan Company, 1925. On pages 144—145 he comments on the "lock step type of curriculum and class organization" in Canadian medical schools. "Other marks of the old-fashioned schoolmaster are also present, for attendance is recorded and certified by instructors and lecturers for the dean."

CHANGING MEDICAL FACULTY RESPONSIBILITIES

This sketch of the historical background and development of medical education in Canada may be concluded by depicting some of the changes taking place in the *teaching responsibilities of the modern medical faculty.* Fifty years ago the bulk of the teacher's university time had to do with medical undergraduate instruction; and, on the average, he did little research. Today he is likely to be teaching in his department students from faculties or schools of arts and science, agriculture, dentistry, home economics, laboratory technology, nursing and pharmacy. In addition he may be teaching graduate students proceeding to a master's degree or a doctorate. When the teaching time devoted to all of these groups is converted to so-called "full-time medical student equivalents", as in Table 2–2, then it is seen that in the eight smallest of Canada's twelve medical schools (selected because of complete questionnaire returns from these schools in 1962–63), *the medical undergraduate portion was just one-half of the total teaching responsibility of the faculty.* Medical students numbered 1,695. Graduate students and post-doctoral fellows, omitting hospital interns and resident staff, came to 309[1]. In addition, there were 5,660 other

TABLE 2–2

FULL-TIME UNIVERSITY STUDENTS TAUGHT BY MEDICAL FACULTY IN THE EIGHT SMALLEST CANADIAN MEDICAL SCHOOLS, 1962/63[1]

Category of study	Number
Medical students (four years)	1,695
Graduate students:	
Basic science — Masters	70
Doctoral	76
Post-doctoral	15
Clinical fellows, post-doctoral	148
Other students[2]	1,207
Total	3,211

Medical students represent 52 per cent of university teaching responsibility of medical faculties in eight universities.

[1] Excluded are intern and resident staff of hospitals and instruction of student nurses on the wards.

[2] Expressed as full-time medical student equivalents. This represents 5,660 students from arts and science, agriculture, dentistry, home economics, laboratory technology, nursing and pharmacy, who take regular classes with teachers in the medical faculty.

Source: "Annual Reports on Medical Education," *Journal of American Medical Association,* 186: 649, 1963.

[1] Recent studies conducted by the Association of American Medical Colleges have shown that the effort devoted by full-time clinical faculty to the instructions of intern and resident staff in the teaching hospitals may equal or exceed that given to undergraduate medical students. (Personal communication to members of Project Group, Evanston, Ill., June 1962.)

students who were estimated to be equivalent to 1,207 full-time medical students. It is the latter group, from other faculties, that has been growing in proportion to the growth of the total university student body. It is clear that the teacher-student ratios so often quoted for medical faculties are seldom meaningful because they usually disregard both graduate students and those from other faculties. With the development of "the university health science centre", described in Chapter 5, it is likely that still larger numbers studying for the allied health professions will require instruction by members of the medical faculty.

Going hand in hand with the expansion of medical research, dealt with in Chapter 10, is the growth of *graduate study towards higher degrees.* In most of the eight smaller medical schools this activity has developed chiefly since the end of the war, 1945. Table 2–3 reveals the number of master's and Ph.D. degrees awarded in the past seven years in the biological sciences relevant to medicine. The programme in medical biophysics is noteworthy. Curiously enough, genetics has not expanded as one would expect, considering the great progress in this field in the past decade. *The relatively stationary output of the graduate schools of Canada in this seven-year period,* is very alarming in relation to the needs for trained scientists and teachers. This situation is considered in Chapter 12.

Of the 47 Ph.D.'s received in these bio-medical fields in 1962-63, 27 were awarded by McGill and Toronto universities. Over a five-year period the eight smaller medical schools awarded 40 per cent of masters and 31 per cent of the doctorates compared with their intake of 52 per cent of the first-year medical students that year.[1] Of encouraging interest is the fact that the year of 1962-63 saw the largest number of higher degrees awarded; also a good increase in the number of graduate students enrolled. Since 1956-57 the increase in enrolment has been 36 per cent for master's work and 60 per cent for Ph.D.[2]

A recent estimate of the desirable number of graduate students to be enrolled sooner or later in a modern medical school is to be found in Table 2-4. The total number proposed for both basic science and clinical departments, in a school receiving 64 first-year students, is 70 graduate students and post-doctoral fellows. For a larger medical school (96 first-year students) the estimate is 95. In most respects this table has been found to be relevant to Canadian experience, e.g., a faculty of 35 is assumed in the basic science departments of School A (64 students in entering class) whereas the average for eight schools of the size in Canada in 1961-62 was 34. Under these circumstances the American estimate of 70 graduate students and post-doctoral fellows may well be attained in the future; an enrolment almost double that shown in Table 2-2 (average for eight schools, 38).

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[1] "Annual Reports on Medical Education", *Journal of the American Medical Association,* (November of each year).

[2] Spinks, J.W.T., Graduate Studies and Research in the Sciences. In "Canada's Universities in a New Age", *op. cit.,* p.43. An increase of 43 per cent in graduate enrolment by 1965–66 was projected.

TABLE 2–3

EARNED GRADUATE DEGREES IN THE BIOLOGICAL SCIENCES RELEVANT TO MEDICINE, GRANTED BY CANADIAN UNIVERSITIES, 1956/57 – 1962/63[1]

SUBJECT M – Master's D – Ph.D.	Number of Master's and Ph.D. Degrees, by Years							
	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	TOTAL 7 years
Anatomy[2]. . . . .M	2	2	3	3	6	3	7	26
D	3	3	0	2	5	1	1	15
Bacteriology[3] .M	10	9	10	18	12	21	23	103
D	5	5	5	4	2	1	2	24
Biochemistry .M	16	19	16	9	16	10	17	103
D	20	20	14	18	15	15	23	125
Biophysics M	1	0	0	4	0	2	3	10
Incl. Med. Biophysics . . .D	0	2	1	1	2	1	6	13
Genetics . . . . .M	1	1	0	2	2	0	0	6
D	3	2	1	2	1	1	3	13
Pathology . . . .M	1	1	1	3	1	5	1	13
D	2	0	1	1	0	1	5	10
Pathological Chemistry M	0	1	2	0	0	0	0	3
D	0	0	1	0	2	0	0	3
Pharmacology M	3	2	4	7	4	7	3	30
D	2	5	3	3	4	4	1	22
Pharmacy . . . .M	7	6	7	7	7	6	10	50
D	–	–	–	1	1	0	0	2
Physiology . . .M	12	13	6	9	13	6	6	65
D	9	3	7	2	5	6	6	38
Total – Master's	53	54	49	62	61	60	70	409
Ph.D.	44	40	33	34	37	30	47	265

[1] Includes some degrees granted to graduate students from Agriculture, Biology, Dentistry, Pharmacy and Veterinary Sciences. Some of these, no doubt, may receive appointments in medical science departments.

[2] Includes Microscopic Anatomy and Neuroanatomy.

[3] Includes Immunology, Biochemistry and Bacteriology, Microbiology and Virology.

Source: *Survey of Higher Education*, Education Division, Dominion Bureau of Statistics, Ottawa: Queen's Printer, May, 1962. Also, unpublished data for 1963.

It should be added at once, as will emerge in the further chapters of this report, that its authors do not favour an exclusively full-time clinical faculty. We believe in the importance of the special role to be played by the well-selected part-time teacher engaged in medical practice. The reason for this is disclosed in

TABLE 2–4

ASSUMED FACULTY, GRADUATE STUDENTS, AND POST-DOCTORAL FELLOWS FOR A FOUR-YEAR MEDICAL SCHOOL

Type of Position and Department	School A entering class of 64 students	School B entering class of 96 students
Full-time faculty:		
School Total	95	135
Basic science departments	35	50
Anatomy	7	10
Biochemistry	6	9
Physiology	6	8
Microbiology	5	7
Pathology	6	9
Pharmacology	5	7
Clinical science departments	60	85
Medicine	18	25
Surgery	15	21
Pediatrics	5	8
Obstetrics	3	4
Psychiatry	10	14
Radiology	5	7
Preventive medicine	4	6
Graduate students and post-doctoral fellows:		
School Total	70	95
Basic science departments	40	55
Anatomy	7	10
Biochemistry	10	14
Physiology	6	8
Microbiology	6	8
Pathology	6	8
Pharmacology	5	7
Clinical science departments[1]	30	40
Medicine	8	11
Surgery	5	7
Pediatrics	3	4
Obstetrics	1	1
Psychiatry	8	10
Radiology	3	4
Preventive medicine	2	3

[1] Does not include house staff for hospital.

Source: *Medical School Facilities — Planning Considerations.* Public Health Service Publication No. 874, 1961. Prepared by the joint efforts of the United States Public Health Service and the Ad Hoc Committee on Medical School Architecture of the Executive Council of the Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association, Appendix A.

the next section dealing with further trends current in medical education today. One would hope also to seek a good balance between teaching and research objectives.

CURRENT TRENDS IN MEDICAL EDUCATION

The major movements in medical education today arise largely from (1) the impact of modern science upon the subject matter of medicine itself, and (2) the necessity to adapt professional education to the changing requirements of society *The play of strong forces and the speed of adaptation to them in the centres of ferment, along with the mood for critical self-scrutiny and experimentation, often systematic in design and occasionally radical in nature, may well be producing in the third quarter of this century a "climate of change" without parallel in the history of higher education.*

The growth of scientific knowledge and of technical skills has been described already as staggering. Based on counts of publications and research personnel and on other considerations, the sum total of scientific knowledge is believed to be doubling each decade. The medical sciences share in this explosive expansion of technical knowledge and skills. The resulting benefits have been enormous. Many crippling and fatal diseases are controllable; much misery can be abolished. In fortunate parts of the world, or segments of society, the resulting progress in public health and in definitive medical care, along with improved conditions of living, has justified the expectancy of a longer and more comfortable life.

These changes have brought their own problems but at the moment we are concerned with the *implications for medical education of this mammoth advance of science.* They may be considered conveniently under these headings: the fragmentation of knowledge, the decline of interest in teaching, depersonalization in medicine and the impact of hospital-centred teaching.[1] The problems depicted reflect current North American, British and sometimes European trends rather than issues that are necessarily acute in Canada at the moment.

(1) The fragmentation of knowledge has been a natural consequence of specialization in scholarship. The new research by its sheer mass and complexity has tended to isolate scientists from one another. The growth of whole new vocabularies has made communication difficult even between specialists within the same general field. It has become harder than before

[1] This account is based on the observations of many medical teachers and scientists, physicians, scholars in other faculties of the universities, writers and other observers of the current scene. The most useful literary source is the Journal of Medical Education, official organ of the Association of American Medical Colleges, Evanston, Ill. Starting as a quarterly Bulletin in 1925 it became a bi-monthly in 1929, with monthly issues since 1952.

Canadian opinion is to be found chiefly in some 75 articles published in the Medical Education Numbers (first issues each April) of the Canadian Medical Association Journal, 1958–1963. Most of these are review articles or commentary.

Key papers, monographs, research reports and particulary significant statements will be cited by specific references.

to maintain the over-all view. The student has found it hard not to restrict his thinking to the academic empires lying between departmental walls. He has been faced by much meaningless duplication and even conflict in teaching. All in all, these circumstances have tended to hinder him from integrating his various educational experiences in one harmonious, comprehensive learning process. This is not to deny either the reality or desirability of clashes in the interpretation of evidence, or even in its perception (as in arguments about thyroid disease, peptic ulcer, suicide or allergy); it is rather to emphasize the need to bring scientific controversy fully into the academic setting so that all may gain experience in clarifying issues, in weighing evidence, in understanding the basis of differences between viewpoints and in learning to live amid them.

These problems of specialized scholarship and the fragmentation of knowledge are found in most reaches of higher education today. Associated with them also are wide-spread problems in pedagogy: the need to give mass instruction, the tendency for much of learning to be little more than memorization and the failure of a majority of students to assume active responsibility for their own intellectual development. The corrective trends concern fresh objectives for teaching, a different conception of the student's role in his own education, changed attitudes towards subject matter, and various types of reorganization of the curriculum and of methods of appraisal of the student's progress. Some of these viewpoints are as old as Plato, and in certain institutions in several countries the changes to be described have been in effect for some time. In some universities, however, they would be regarded as revolutionary and any attempt to introduce them by edict would be resisted.

(2) A decline in interest in teaching has been noted in some departments or institutions where interest in research has been great. This is an understandable consequence of the common practice of basing faculty appointments and promotion on accomplishment in research, or the promise of it. An excessive burden of teaching, especially if it entails much lecturing of a routine nature or lengthy supervision of dull, stereotyped exercises in the laboratory, makes teaching distasteful to research-oriented members of faculty. The task of achieving a healthy balance of emphasis in teaching and research has claimed wide attention.[1] There is a wave of concern to give greater consideration to competence in teaching when candidates for appointment or promotion are being appraised. This appears to parallel the reaction against outworn, ineffective methods of teaching. At the same time, in many medical schools the research programme has become an indispensable requisite to the improved methods of project teaching. When the research programme of the faculty serves to engender and diffuse a spirit

[1] The Ninth Teaching Institute of the Association of American Medical Colleges, Denver, December 3–7, 1961, gave special attention to these topics. The report, "Research and Medical Education", was published as a supplement to the *Journal of Medical Education*, 37: No. 12, December 1962, Part 2, pp. 1–279.

of critical enquiry throughout the medical school, and when the latter's educational objectives are truly broad, then teaching and research interests are likely to be in harmony.

(3) A depersonalized attitude in both medical care and teaching has been attributed to preoccupation with the mechanisms of science. Has the increasing desire to unravel the mysteries of disease and of organ function by complex laboratory methods diverted interest from the problems of the patient as a whole person? Undoubtedly, to a degree; but other factors may play a part too.

It is not many years since most clinical teaching was confined to the vast public wards and dispensaries of the metropolitan charity hospital. Patients were there because they came from a social class with a meagre income; or they were indigent because of misfortune. The best teachers showed a genuinely compassionate, human interest in their patients, in the finer tradition of their medical heritage. Some however may have shown less charity to the poor and unfortunate. Today there may be an element of residual social inheritance of the latter attitude; and the humanistic tradition in medicine may receive less emphasis in an era when science is able to do so much in a physical way.

The tendency to depersonalization in physicians' relationships may spring also from an inadequate understanding of human behaviour. One of the most striking developments in modern medicine has been in psychiatry. Advances in treatment in the past quarter-century have shortened radically the duration of serious mental illness and increased greatly the proportion of patients who could return to effective living. In wartime, a better understanding of the dynamics of morale in the troops and the success of military psychiatrists in dealing with emotional problems, along with major advances at this time in psychosomatic physiology, gave psychiatry a new status in the broader field of medicine. This has been enhanced in the post-war period as more effective drugs, electrotherapy and better use of the principles of rehabilitation made their mark.

The reflection of this trend in medical education has been the blossoming of full-fledged university departments of psychiatry, most of them with a core of full-time staff. Within a decade teaching time was nearly doubled, with practical work nearly trebled. Canadian teaching in psychiatry has been praised. It "tends to be eclectic, presenting genetic and neurological aspects along with psychological theory". Factors in the social setting are receiving increasing attention. There is, understandably, therefore, "satisfaction, on the whole, with the improved ability of the graduates of recent years to cope with the emotional problems encountered in medical practice".[1]

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[1] Reported by Canadian deans of medicine in review, "The Changing Scene in Canadian Medical Education," *Journal of Medical Education*, 36: 1079–1091, 1961.

For a British view of American teaching in psychiatry see: Shepherd, Michael, *The Teaching of Psychiatry in the United States*, London: Pitman Medical Publishing Co. Ltd., 1962. Its final sentence reads: "No branch of medicine has more to gain from a pooling of Anglo-American experience."

At the same time, however, one notices lags in the development of modern psychological medicine in certain medical schools and hospitals which to some degree may be cultural in nature. In spite of provocative demonstrations 20 years ago of the effect of emotional influences upon various physiological systems[1] the majority of clinical departments have not engaged in research that would either substantiate or refute psychosomatic hypotheses in the case of a number of important disease groups. At their staff conferences there is little evidence of interest *at the academic level* in the emotional and other personal factors that appear to play an important part in the course and outcome of many predominantly physical disabilities. Still more serious is the frequently heard disparagement of the field of psychiatry by competent physicians and surgeons; a disdain matched by the scorn of some psychiatrists for their colleagues who deal primarily with physical derangements.

What lies behind this situation? Some would say that our students are more fully emancipated in this realm than older members of faculty who did not have the advantage of the improved instruction in psychiatry in the post-war period. Some of the trouble is certainly due to the isolation of departments from one another and to the increasingly narrow responsibilities of specialists. Conspicuous in this connection is the younger generation of psychiatrists who in some centres receive no training in general medicine and get little or no experience in *close* team work with representatives of other branches of medicine. In any case, there is the suggestion in some medical circles of something like a "cultural block" that stands in the way of admitting emotional matters to the scientific circle. It may be the vestigial remains of an ancestral trait to suppress one's feelings; or in part also a hangover from the old mind-body argument that divided philosophers, theologians and even ordinary citizens into bitterly opposing camps.

This discussion of problems in the maintenance of a personalized approach to the care of patients has been set forth at some length for several reasons. The first is its relevance to the work of the physician which is likely to be subject in the future to further depersonalizing influences; for example, the need to use still more complex technical methods and to give more service to more people. The second is to illustrate further the consequences of the fragmentation of knowledge and experience, and the isolation of disciplines.[2] The third points up the scope and potential value of a more

[1] See many papers by F. Alexander, F. Dunbar, P.D. Maclean, E. Weiss, S. Wolf, H.G. Wolff and others from 1940 onwards.

[2] A Canadian professor has illustrated well the slowness with which established knowledge is assimilated by those outside the field in which it has been refined. For example, there is resistance to recognize the frequency with which "normal" people experience periods of depression, suspicious moods, feelings of guilt, impulses to violence, longings for suicide or domination by compulsive urges. Erroneous ideas are entertained also about sexual matters.

On the other hand, there is also the tendency to overlook quite pathological behaviour. "For instance, we not infrequently term an individual an incisive, straight-from-the-shoulder, down-to-earth sort of person, who is actually a deeply sadistic individual who gets his pleasure from injuring others."

Cameron, D.E., "The Swing of the Pendulum," *Canadian Medical Association Journal,* 85: 604–608, Sept. 2, 1961. This paper describes well the problems and scope of modern psychiatry.

refined study using the new skills of the social sciences (which have also had to make their way against opposition somewhat similar to that encountered by psychiatry). Finally, it depicts some aspects of the situation that stimulated the quest for better integrated and more comprehensive health care; also the search for good methods of teaching it. All of these influences will be seen at work in the new approaches to be described shortly.[1]

(4) Hospital-centred teaching is an inevitable accompaniment of modern scientific medicine. The hospital houses the apparatus, the technical personnel and the patients whose problems in diagnosis and treatment became the object of critical study. Its wards, operating-theatres and laboratories comprise the stage on which the miracle play of modern medicine reaches its climax. It was here that teaching by apprenticeship reached its pinnacle as "graded responsibility under supervision" in the care of patients welded together the team of physician-teacher, resident, intern and clinical clerk (student).[2] It has been essentially "case-centred" medicine and, as already described, predominantly "disease-centred". Moreover, discussion has tended to dwell upon major illness, the problem case and highly technical investigation. "The student tends to think of health care in terms of meeting acute episodes rather than as a continuing responsibility with concern for the maintenance of health by watchful prevention."[3]

Not only has the hospital-patient been at the heart of scientific advance in medicine; his care has been increasingly in the hands of more and more highly specialized physicians. Most of the resident posts are filled by graduates working towards specialty examinations.[4] The full-time clinical scientist is now essential to the teaching and research obligations of the university. Out of all of this will come further scientific advance and greater technical competence. At the same time the gap between academic medicine and the care of people at the level of the doctor's office and of the home has widened. The tension between university teachers and the practicing profession has sharpened;[5] the role of the family physician has been devalued, and there is public complaint that medical graduates lack understanding of community needs.[6]

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[1] For provocative comment on the importance of the psychological and social aspects of medicine, see Pickering, Sir George. "The Present Scope of Medicine," *Journal of Medical Education*, 38: 681–687, 1963.

[2] Chapter 6 carries forward the story of the teaching hospital. Chapter 9 describes the system of resident training for the clinical specialties.

[3] Background paper for conference "Training for General Practice", *Canadian Medical Association Journal*, 88: 705–712, Apl. 6, 1963, p. 707.

[4] For arresting figures on the number of physicians presenting themselves to the Royal College of Physicians and Surgeons of Canada for examination in the medical and surgical specialties, in relation to the number graduating from Canadian medical schools, especially since 1956, see Chapter 9.

[5] The relation of medical education to the medical profession, organized and individually, was the theme of the Tenth Teaching Institute sponsored by the Association of American Medical Colleges, 1962. The main papers are reported in *Journal of Medical Education*, 38: 451–510, June, 1963.

[6] Sanders, M.K., *The Crisis in American Medicine*, New York: Harper and Brothers, 1960.

Here and there, both within and beyond educational circles, there has been growing awareness of the need to supplement hospital-centred teaching and, indeed, to relate the entire process of medical education more clearly to the life-long welfare of the individual and to the requirements of society as a whole. Both military and industrial experience demonstrated the practical advantages of maintaining physical and mental fitness. The rehabilitation movement following World War II exerted a wholesome integrating influence by mobilizing not only medical skills but all of the resources of society (physiotherapy, counselling, aptitude appraisal, sheltered employment, etc.) to return the handicapped person to a life of usefulness and satisfaction.

In neglecting to provide continuing, comprehensive health care according to new standards taking shape, even the best hospitals failed to meet the needs of medical education. It is understandable then that in the decade following World War II there should be a spate of experiments by hospitals and medical schools in the form of home care plans, comprehensive clinics, affiliation of different sorts with community hospitals, family studies by students and various types of preceptorship with medical practitioners. All had the purpose of correcting the various deficiencies or states of imbalance described. All bore testimony to a fresh understanding of the old tenet that good professional education was based on a demonstration of good professional care. The latter was more than merely making a diagnosis and given the specific drug or surgical treatment. It involved understanding the impact of the illness on the patient and his family, on their aspirations and on the roles expected of them at work and in the community. It demanded looking backwards at contributory factors with a view to preventing recurrence; and looking ahead to size up the circumstances that would either assist or thwart in "the more positive quest of the greatest possible degree of physical, mental and social well-being".[1]

The changes taking place in the last 20 years were in logical response to obvious signs of the times. Nevertheless, the main force immediately behind the innovations to be described would seem to be the determined will of individuals with particular insight, vision and sense of responsibility. These qualities of the prophets were exhibited by members of faculty, both physicians and scientists, by university presidents and trustees, by the officers of foundations and by interested citizens. What distinguishes recent developments from similar efforts in history, it is suggested, is the presence of *a new element; a widespread respect for the methodology of science in solving problems in fields where objective data may be studied.* The problems of professional education and health care lend themselves to objective analysis to a greater degree than had been thought possible in the past.

CURRICULUM DILEMMA

New movements frequently create new problems. The reforms instituted early in this century in the United States prompted the adoption of standards of

[1] See Chapter 1, p. 1.

curriculum which soon became criticized for excessive rigidity. Protests against the dangers of a stereotyped curriculum appeared in addresses and reports from 1910 onwards.[1] They were followed later by charges of congestion of the curriculum as new courses were added and students were expected to master larger amounts of ever more detailed knowledge. This was inevitable amid the confusion of views about the goals of undergraduate teaching. Except in the medical schools with a strongly scientific emphasis, as at Hopkins and Cambridge,[2] the objectives of the medical course were professional – the production of the safe general practitioner; for practice as a specialist further training would be required.[3] This view, which prevailed also in Canada, made it necessary for clinical departments to teach the knowledge and skills needed in medical practice of the day. Moreover, until recently, they could not assume that their clinical instruction would be supplemented by hospital internship.[4] There was still other evidence, however, to favour a swing in emphasis in the undergraduate course away from a primarily professional training to a truly educational experience in the university sense.

Not only was the prevailing curriculum incapable of matching the rapid progress of medical science, it was becoming more and more intolerable to the student and it was starkly archaic in the light of established principles in the psychology of learning. Two members of a Canadian medical faculty stated in 1943: "The total amount of information placed before the medical student of today is truly appalling. New facts and new theories are presented for his mental digestion hour after hour and day after day, and some of them with very little sauce. It is small wonder that the mental appetite of the medical student often becomes dulled, and that he shows all the signs of mental indigestion. Only a mind skilled at learning can deal satisfactorily with this steady stream of information".[5] This impression was reported by faculty members and other

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[1] Smiley, D.F., *op. cit.*, p. 9–11.

[2] "It appears that the function of university education is not special instruction in the lines of a profession or trade, however these ends may substantively be promoted, but in expanding and enlarging the mind and making it a more and more perfect instrument of knowledge and progress, whatsoever its destination." Allbutt, Sir Clifford T., *On Professional Education with Special Reference to Medicine*, London, 1906. Quoted by Fulton, John F. *Proceedings of the First World Congress on Medical Education, London, 1953*, London: Oxford University Press, 1954, p. 27–28.

[3] "The training must fit them to enter practice as general practitioners, and must also provide a sound basis upon which those who wish to become teachers and specialists can found the post-graduate training and experience which they will require." *Report of the Inter-departmental Committee on Medical Schools, op. cit.*, p.39. (The Goodenough Report.)

[4] It was not until 1954 that the College of Physicians and Surgeons of Ontario made the internship a requirement for registration.

[5] Ham, Arthur W. and Salter, M.D., *Doctor in the Making, The Art of Being a Medical Student.* Philadelphia: J.B. Lippincott Co., 1943, p.vii. This is the first Canadian work dealing specifically with a major theme in medical education.

Other significant Canadian publications are:
Gibson, W.C., *Young Endeavour, Contributions to Science by Medical Students of the Past Four Centuries.* Springfield, Charles C. Thomas, 1958.
Clute, Kenneth F., *The General Practitioner.* Toronto, University of Toronto Press, 1963. The entire volume is relevant to the topics of this report. Pages 331–494 include excellent discussion of current trends in medical education with a useful bibliography.

observers of teaching in many medical schools.[1] After reviewing the development of medical education in Britain, Newman recommended well-planned experimentation with suitable protection of the student from harm in the course of the experiment: "Fortunately, education is so defective that a good deal could be done in the moral certainty that the end-product would be improved".[2] The Goodenough Report[3] regarded the medical curriculum as in urgent need of a drastic overhaul and suggested that its accomplishment might be a condition to be satisfied before any increase in Exchequer grants-in-aid of undergraduate medical education might be made. It recommended initiative by the General Medical Council without delay.[4] Many critics on both sides of the Atlantic Ocean questioned the relevance of much of the teaching. For example, did the lengthy laboratory exercises accomplish what was desired? *Almost everywhere there was evidence of lack of clarity in objectives and of precise knowledge of what was being accomplished.*

Not all students have had the same experience, even in the same institution at the same time. A strong scholar can never be held down. Some students accept the situation glibly or in a mood of passive resignation. Others have built up strong resentments which have endured.[5] An attitude of apathy has been noted in students formerly enthusiastic; and the authors of this report met upper classmen in one of our medical schools who reported frank boredom among

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[1] Williams, P.O., and Rowe, V. Mary J., eds., *Undergraduate Medical Curricula Changes in Britain.* Proceedings of a meeting of the Association for the Study of Medical Education, 7th December, 1961. London: Pitman Medical Publishing Co. Ltd., 1963. The Dean of the Faculty of Medicine of Birmingham University reported that the performance of students in the wards was at its best in the nine months to a year following their arrival in the hospital, when they were enthusiastic and intellectually keen. "It seemed to be agreed that they reached their period of poorest performance in their final year". Similarly at Sheffield; when reporting on the new curriculum established in 1959 the Professor of Medicine stated: "I must say that for the first time my sixth year students seem prepared to interest themselves deeply in medicine".
At Glasgow University it was noted that senior students appeared to feel lost during the final revision term when they had no special attachments. It appeared that despite six years at university they were not well-equipped to work on their own. The Dean wondered if the marked emphasis on didactic teaching which hitherto characterized the clinical years in Scotland might be responsible for inhibiting initiative." The conference agreed that the authoritarianism which has dominated the intellectual atmosphere of clinical studies in most British medical schools until quite recently may be equally important."

[2] Newman, Charles, *op. cit.*, p. 249.

[3] Report of Inter-departmental Committee on Medical Schools, *op. cit.*, p. 31. See also Illingworth, Sir Charles — "Medical Education, A Plea for an Experiment," *The Lancet, 1964,* Volume 1, 284—286.

[4] General Medical Council. *Recommendations as to the Medical Curriculum.* London, 1957. In this revision the medical schools were requested to re-examine their courses and to experiment with curriculum and teaching methods. The goal was "to instruct less and to educate more". This incentive, along with a lifting of restrictive regulations on subject syllabus and examinations, catalysed an already present ferment of interest in improving medical education. The result has been a series of more or less radical changes in the curricula, particularly in the university medical schools, e.g., Birmingham, Durham, Edinburgh, Glasgow and Sheffield. Some of these are described by Williams, P.O., and Rowe, V. Mary J., *op. cit.* Unfortunately, this account came to hand too late to incorporate its excellent discussion of recent curricular changes, in Britain in the text of this report. For an informative survey see Ellis, John R., "The Changing Scene of British Medical Education," *Journal of Medical Education,* 37:834—839, 1962.

[5] The relation of unfavourable emotional reactions engendered in student days to particular patterns of performance in later professional life is just one of a host of interesting but relatively unstudied problems. For example, in continuing education for practitioners why do some never appear at a refresher course and others who are perennial visitors appear to play the same passive, note-taking role as do many undergraduates?

classmates at a time when one would have expected daily clinical experiences in hospital to be highly exhilarating. Many teachers too have overcome the restraints of the standard curriculum and are able to arouse a dynamic response in most of their students.

The shortcomings of a rigid curriculum were clearly pointed up in the report of a Commission established in 1925[1] "to make a study of the educational principles involved in medical education and licensure, and to make suggestions which would bring them into more satisfactory relations with the newer conceptions and methods of university education, on the one hand, and with the needs of present-day society, on the other". The Commission on Medical Education declared: "It is apparent that different students require varying periods of time in which to acquire the same knowledge, and that uniform course and time requirements for all students are obviously unsound, although our present system of classes and 'lock-step' progression of students is a direct result of such requirements."[2] Then, later in this invaluable report, appears another assertion: "The present system of detailed subject examinations, which rely so largely upon memory and which are still popular in secondary schools and some colleges, tends to defeat the major purposes of the training, which are not the collection of facts but the intelligent and discriminating use of knowledge which is applicable to a given problem".[3]

This statement of purpose of the Commission on Medical Education and the two assertions yield clues to the new objectives now beginning to loom large in discussions around the world.[4] Along with the trend to use research methods to appraise everything that goes on in the medical college and teaching hospital they comprise a movement that bids fair to change the face of medical education before the end of this century. The purpose of the course is not to implement a curriculum; it is to encourage intellectual growth. Teaching is not primarily to cover subject matter but to help a young person develop in order to fill intelligently a responsible role in society.

The physician should understand human behaviour, not only in his patient and in himself but also in the institutions of society. The university responsible for his education has a real concern to understand what society expects of its graduates and how they perform. We are now entering the era of "student-centred" medical education, committed to serve society.

Just as the Johns Hopkins in Baltimore at the turn of the century crystallized the most enlightened concepts of medicine in the university setting, another

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1 *Final Report of the Commission on Medical Education*, New York, 1932. Chairman, A. Lawrence Lowell, President of Harvard University; Director of Study, Willard C. Rappleye, Dean of Columbia University College of Physicians and Surgeons. A Canadian member was Sir Robert Falconer, President of the University of Toronto. The Commission was organized by a committee appointed by the Association of American Medical Colleges.

2 *Ibid.*, p. 229.

3 *Ibid.*, p.243.

4 Ellis, J.R., ed. *Methods of Learning and Techniques of Teaching, the Proceedings of the Second Annual Conference of the Association for the Study of Medical Education, 15th–16th October, 1959.* London: Pitman Medical Publishing Co., Ltd., 1960. See also International Issues of the *Journal of Medical Education.*

American university 50 years later became the symbol of the current intellectual awakening in medical education. This was the Western Reserve University in Cleveland. Again it was not that any single element in its effort was unique; many of its features had appeared or were developing elsewhere. It is because of the totality of changes made, their historical timing and the consistent loyalty of the faculty to their professed educational philosophy that the Western Reserve Experiment stands out as a significant landmark and as an object lesson to all who would plan new medical schools or reorganize old ones.[1] "The essence of Western Reserve is that they have actually put into practice some of the reforms which other medical educators had been talking about for the past 50 years."[2] On the whole, no medical school since Hopkins has exerted so striking an influence on contemporary medical education. Yet some faculties tried out portions of the Western Reserve programme only to discard them. Why this paradox? The explanation is important enough to be presented clearly. Too many of the visitors, and commentators who did not visit, perceived only the devices of the curriculum, missing the underlying philosophy and the historical stages through which the faculty moved in developing its instrument – the curriculum. This distinction is well worth understanding.

Within five years of the appointment in 1945 of Dr. Joseph T. Wearn as Dean of Medicine of Western Reserve University, death and retirement permitted the selection of new heads for ten of the thirteen departments of the medical school, all committed to re-examination of their task as teachers. The atmosphere was conducive to critical scrutiny of current approaches and to deliberate, logical reorganization of the curriculum according to the principles they were to adopt. What did they find? Just what would have been apparent in most medical schools – spoonfeeding methods of teaching, growing gaps between scientific disciplines, a lack of collaboration between departments, a rigid curriculum that took no account of variations in student interest or aptitude and the devastating effect upon students of fixation on examinations, on grades and on learning by memorization. Also missing was a deliberate, systematic and continuous effort to mold the student as a person for his later professional role. In the eyes of this faculty, medical education needed a dominant, guiding principle to weld its parts together.

The objectives adopted by the Western Reserve faculty were simple: "To teach medicine as a coherent, meaningful whole rather than a series of unrelated

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[1] There are at least 50 references in the literature to the new programme at Western Reserve University. Two of these cite the significant titles and give a definitive account of the subject. The third, a book review, offers a brief outline. The account in the text draws extensively from these sources.
Ham, Thomas Hale, "Medical Education at Western Reserve University". A Progress Report for the Sixteen Years, 1946–1962. *The New England Journal of Medicine*, October 25 and November 1, 1962, 267: 868–874, 916–923.
Lee, Peter V., *Medical Schools and the Changing Times, Nine Case Reports on Experimentation in Medical Education — 1950—1960.*
The Association of American Medical Colleges, Evanston, Chapter 4, Reorganization of the Medical Curriculum. Presented also in *Journal of Medical Education*, 36: 101–116, Part 2, December, 1961.
Macleod, J. Wendell, *Review of Medical Schools and the Changing Times*, Milbank Memorial Fund Quarterly, 42: 98–112, January, 1964.

[2] Lee, Peter V., *op. cit.*, p.77.

disciplines and to give the student from the beginning of his medical education a feeling for the central purpose in medicine, to deal helpfully with patients''.[1] These goals were to be attained by selecting the content of teaching for its importance and by arranging it in sequence; by rejecting any attempt to cover all fields of medical knowledge in favour of ''learning to distinguish fact from theory through familiarity with the scientific method''; by fostering ''an understanding of the patient as a person and as a member of society''; and finally, by treating the student himself as ''a maturing individual who could take increasing responsibility for his own education''. These were the features of the *credo* on which the curriculum at Western Reserve was reconstructed.

What did they do? A brief reference to the curricular methods adopted may explain their refreshing impact. Teaching was integrated around general topics by a committee drawn from departments concerned; e.g., from biochemistry, microbiology, pathology and radiology to teach the mechanisms of cellular and tissue injury and repair. For a month at the end of first and second years (originally one day a week) the student worked at a research project to whet his curiosity and to learn the application of scientific method to the solution of a real problem. In fact, most of his laboratory training was research in miniature. In the final year, a ''bioclinical'' half day each week brought basic science and clinical scholars together to discuss live issues; and for graduation a project thesis was completed.

Human problems, as an official concern, were introduced as early as enzymes. Each first-year student followed the family of an expectant mother through delivery and on into the walking and talking stages of the new child's development. Guided for two years by the same preceptor, the student learned to relate his studies to his own conception of the target and to the objectives of the course. In subsequent clerkships on the wards and in the group and continuity clinics the student took responsibility for the provision of exemplary comprehensive care for both hospital and ambulatory patients. Free time was allotted officially for projects, extra clinical work, study or recreation according to the interest of the student. This illustrated the faculty's determination to treat the student as a maturing person, giving him an opportunity to make decisions and to assume responsibility for continuing self-education. Examinations were made an educational instrument by holding them only at the end of major subject blocks and by returning corrected papers. Class ranking and numerical grades were abolished; only honors, pass or fail grades were given. Finally, research on the process of education itself was made an official activity of the faculty.

What has been the significance of the Western Reserve demonstration? Faculty and students have rendered an enthusiastic verdict of successful accomplishment as numerous descriptive reports and studies testify.[2] Its influence is frankly visible in new medical schools as at the University of Florida at Gainesville, the University of Kentucky at Lexington, the University

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[1] **Lee, Peter** V., ibid., p. 64.

[2] **Ham, Thomas Hale,** *op. cit.*

of Western Australia at Perth, and half a dozen others; and in reorganized medical courses as at University of Colorado at Denver, Stanford University at Palo Alto, University of Durham at Newcastle-on-Tyne[1] and many others. Integrated teaching inaugurated in clinical subjects at the University of Saskatchewan in 1955 stemmed directly from Colorado and Western Reserve experience. At McGill, the elective month in third year, the replacement of final written examinations in fourth year by comprehensive orals at the end of each clerkship and other curricular changes reflected the same movement.[2] It must be repeated, however, that the solutions in terms of curricular technique at Western Reserve are not as significant as the educational objectives established by the faculty, their loyalty to them and their method of approach. These are the features to emulate, many would say, not necessarily any particular details of curriculum.

In this connection one should note the effort to remove the authoritarian attitude not only from the relationship between teacher and student but also from the hierarchy of the faculty. A model of democratic faculty organization was created and all moves were made only after thorough study in representative committees, then examination of their well documented findings by the general faculty. Under these circumstances, and with a strong sense of need to correct deficiencies, it is understandable that "the faculty not only drew up a statement of objectives but actually used it as a living guide to policy and procedure; it still serves that purpose".[3] Thus the curriculum, being under continuous scrutiny for relevance to an educational philosophy, to which all adhere, is frequently altered in the light of further experience. "They are attempting to solve their own problems as they see them, and are not trying to create a blueprint for medical education to be followed unthinkingly by others."[4]

The complexity and strength of the drive to examine problems afresh, to hypothesize and experiment and then to evaluate may best be illustrated by

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[1] "It is hoped that the new curriculum will provide for the student a more simple and more logical view of the vast subject he is trying to learn, that it will stimulate and hold his interest more, and that it will make him think for himself more. Incidentally the revision provides the opportunity to reduce as far as possible the factual information the student is expected to assimilate, to increase the time spent on some aspects of medicine that have recently increased in importance, and to set up a structure of curriculum committees in which members of the staff will no doubt learn from each other. At all stages of the curriculum the student will be allowed a reasonable amount of free time and he will be encouraged to engage in clinical or experimental enquiry." *University of Durham Gazette*, Vol. IX, No. 4, March, 1962.

As reported in the *Times Educational Supplement*, London, December 13, 1963, the dean at Newcastle, Professor A.G.R. Lowden, described the "new style medical course in which students study both the structure and function of the parts of the body at the same time, instead of at separate stages as before... In the new course there would no longer be a sharp distinction between clinical and pre-clinical subjects, and instead of having them taught by teachers from different departments at different times, teachers of both kinds of subject would take part in all parts of the course. There would be time for an able student to do a special project in a department of his own choice. Examinations would be held at the end of each stage but it was hoped to make them less frightening and formidable than they had been in the past. Performance during the course would have great importance in assessing a student's final result."

[2] Stevenson, L.G. "A New Venture at McGill, The Combined Course in Science and Medicine," *Canadian Medical Association Journal*, 84: 697–698, 1961.

[3] Lee, Peter, *op. cit.*, p.76.

[4] *Ibid.*, p. 77.

citing a number of other developments in the various aspects of medical education – the total university course, students, the learning process and the relation of medicine to the community. Each one of these topics is the subject of abundant, recent literature. Only sufficient comment will be made to indicate the significance of current trends in these fields.

INTEGRATION OF THE TOTAL UNIVERSITY EXPERIENCE

Should it really take seven to ten years of university education and post-graduate training to become a family physician, twelve to fifteen to become a clinical specialist? Is the course unnecessarily rigid or standardized? Does it throttle imagination and initiative in the well-endowed student? Does it impair the development of proficiency in one who learns more effectively by travelling at a slower pace? Are the educational experiences of college and medical school truly complementary and is the total educational experience yielding the value expected? These questions have been raised by the public, by the profession, by other university teachers and by students. There has been more agreement on some of the answers than on what should be done to correct shortcomings.

For several decades the tendency in preprofessional education in the United States has been to emphasize the educational value of the full liberal arts course with its "climactic final year" when the student pursued in depth the subject of his choice.[1] The educational value was enhanced greatly in those institutions that sought to identify as early as possible the talented student who would blossom rapidly when given special attention and opportunity. The freshman year is not too soon.[2]

The efforts to diversify premedical education by allowing more elective subjects or to stress the liberalizing value of the full arts course were successful only to a degree. Sometimes the faculty ordained more liberal entrance regulations but when meeting as the admissions committee would give weighted value to accomplishment in the science subjects. Again, the liberal arts course seemed to be truly liberalizing in only some of the colleges. Too often the completion of many science courses was not accompanied by a grasp of the broad principles of science or even an understanding of scientific method. Courses in the humanities and social sciences did not necessarily arouse sympathy for one's cultural heritage or an appreciation of the nature of human society. It was natural that there should be fresh attempts to find a better way to prepare students for professional studies, and to offer them more effective medical experience at the same time.

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1 Severinghaus, Aura E., Carman, Harry J., and Cadbury, Jr., William E., Preparation for *Medical Education in the Liberal Arts College*.
New York: McGraw-Hill Book Co. Inc., 1953.
Preparation for Medical Education: A Restudy.
New York, *ibid.*, 1961.

2 Cohen, Joseph W., "Changing Attitudes of College Students and Teachers Toward Scholarship", *Journal of Medical Education*, 38: 95–102, 1963.

For further information on honors programmes see issues of The Superior Student, The Newsletter of the Inter-University Committee on the Superior Student, published by the Committee, 924 Broadway, University of Colorado, Boulder, Colo., since 1958.

Peter V. Lee has described three significant efforts to find satisfactory answers to the questions posed at the beginning of this section. They were begun at Johns Hopkins (1959), Northwestern University (1961) and Boston University (1961) with this common purpose: "to shorten the curriculum, to bring the medical school closer to its parent university, to improve the over-all educational experience for the student, to select students for the study of medicine at an earlier age, and to strengthen the education of future teachers and educators in the basic medical sciences".[1] All three offer the possibility of completion of undergraduate medical studies within six years of graduation from high school. At Hopkins this will be for only the occasional student. About one-third will take seven years and the remainder will require four years each in the baccalaureate and medical course proper. At Boston University, however, starting with 40 the new six-year course is building up to include eventually the entire class of 72. (With summer vacations practically eliminated and tuition fees at $1,750, the arrangements at Boston University may mean drawing from a more restricted group of applicants. Early selection, advanced placement and acceleration of the course will probably loom large in the eyes of students and thus help medical recruitment.)

More important than these features is the prospect of an improved educational experience for participants in all three ventures each with its own approach to educational enrichment. At Hopkins, after two years of college, including at least one year of general chemistry and one year of general biology or zoology, the student embarks on a year devoted primarily to chemistry, physics, biomathematics, English, history and philosophy. Except for one weekly seminar all the afternoons are free for study or independent work. The student is thus introduced earlier in his course to the Hopkins traditional use of electives and free time for research projects.

The new programme at Northwestern arose from a careful analysis of the sequences required to grasp the concepts of modern physics, chemistry, biology and social science.[2] Professors interested in finding better approaches for gifted students devised entirely new courses for them. This is part of a major revolution taking place in the teaching of the sciences and their related mathematics. In behavioural science a similar combined approach to psychology, anthropology and sociology is used. Seminars in the humanities are planned for the two clinical years when there is also an annual 12-week quarter free for special clerkships, research or graduate study in a field of choice. All this and a saving of one or two years! This experiment starting with 25 students, lends itself to easy evaluation because the other 100 students in the standard course will serve as controls.

At Boston University the combined liberal arts-medical programme also saves two years and aims to "provide an improved intellectual climate and allow a faster pace of learning".[3] The two-year liberal arts phase has the goal of

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[1] Lee, Peter V., *op. cit.*, p.5—28. There are ten references to the new arrangements at Hopkins, Northwestern and Boston Universities.

[2] Cooper, J.A.D., and Prior, M., "A New Programme in Medical Education at Northwestern University", *Journal of Medical Education*, 36: 89—90, 1961.

[3] Lee, Peter V., *op. cit.*, p. 22—27.

"providing an understanding of human nature and an awareness of the range of human values, developing an orderly scholarly mind, understanding social problems as they relate to the responsibilities of the physician, and appreciating principles of ethical conduct". The major teaching instruments are the seminar and tutorial. Again, the science teaching has been reorganized and mathematics is taught as part of physics and chemistry.

All three programmes are obviously significant not only for the education of the physician but also in higher education generally. They all place a premium on the capacity of the good student to respond with independent initiative to a logical, uncluttered curriculum with freedom to explore in depth the topics that intrigue him. They all strive for a balance between the scientific and humanistic studies. They have all broken the lock-step of a medical course of rigid length, recognizing the variable capacity of the student and looking on the curriculum as an instrument to be shaped to serve the learner, not to beat him down.

The new curriculum at McGill University (1960-61) reduced their eight-year course after Junior Matriculation to seven years, i.e., comparable in length to most Canadian medical courses.[1] The main purpose of the changes, however, as in those already described, was to permit 25 selected students to follow a more integrated, yet elastic programme which would yield to each one "more than elementary training in some definite field of learning which appeals to him; this major field may be selected from the natural or social sciences or the humanities." The elective month in third year which may be spent on the wards, in a clinic or laboratory, or even at French or music, is a means to this end. The reform in fourth year examinations has already been described. Despite these changes, which have introduced a desirable diversity of emphasis, it remains to be seen how much real "decompression" has resulted for the student.

Canadian primary and secondary schools have made some progress in implementing the principles of "streaming" and "enrichment". A few universities have honours courses permitting early specialization in a field of interest but these are not without their own rigidities. In many other colleges or faculties one has the impression that the "more advanced" classes in the junior and senior year may deal in greater detail with old subject matter, or take up new subject matter at the same level of learning; thus in fact making no greater intellectual demand on the student than did the so-called elementary classes. In several Canadian medical schools, special opportunities are extended to gifted or interested students to pursue advanced study or research. In some cases, as at Manitoba and Toronto, credit toward a B.Sc. degree may be received for supervised study and research during several summer vacations. Recently a revised course in Biology and Medicine has been established at the University of Toronto. Canadian faculties extol the student fellowships for summer research offered by the Medical Research Council of Canada, certain pharmaceutical houses and other bodies as an invaluable means of enhancing the intellectual development of a few students and of appraising their aptitude for scientific work.

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[1] Stevenson, L.G., *op. cit.*, p. 697.

Perhaps the relation of the prevailing pattern of Canadian undergraduate curriculum to the trends under discussion is revealed most succinctly in the following commentary. When one relatively new Canadian medical school was surveyed in 1957 by the Liaison Committee on Medical Education (Association of American Medical Colleges – Council on Medical Education and Hospitals of the American Medical Association) it was advised in this vein: "compared with many medical schools on this continent yours depends on relatively more formal didactic teaching; it gives many more lectures and its laboratory courses are more rigidly standardized. In most departments your teachers attempt more complete coverage of subject matter. Students are given less clinical responsibility and are given it later than in many other schools".[1] Since the time of these verdicts there is the impression of a trend to reduce large-class teaching in fourth year, to increase responsibility for patient care in the clerkship and to reduce the number of lectures in first year (but sometimes to re-allocate them to other subjects!).

The medical course in the traditional pattern is clearly at critical cross-roads. It prepares about half of its students for specialty practice or academic roles in teaching and research; in every case being able to count on an additional four to eight years of post-graduate training. The remainder of the students, the faculty knows, will undertake general practice after a minimum of one year of junior internship as presently required for registration. (In Canada, a minority take a second or third year of hospital training before entering general practice.)

Nobody claims that a one-year internship can provide all the clinical skills required for general practice. It is necessary, therefore, that many technical aspects of medical practice as it is now must be encompassed by the under-graduate curriculum. The great question is whether medical schools can serve at the same time the practical professional goals demanded by present arrangements and the goals of a university type of medical education.

If the course is to remain primarily professional, then it will have to add a great deal more of practical training to it. With medicine changing so rapidly now the graduate might well find himself equipped to practise a medicine already entering obsolescence. On the other hand, if the undergraduate course were to concentrate on educating the future physician to adapt himself intelligently to the changing medicine that lies ahead, and if this dovetailed with a post-graduate period of intensive practical training in the field of his intended practice, then the whole task would be simpler for the student, the faculty and the hospitals; and the public would be better served. A system of continuing medical education might then help the practitioner to assimilate the new fruits of scientific advance as they appear with better hope of success. Such an arrangement would call for *a co-ordination of university education, internship, hospital residency training and continuing professional education* that does not now exist.

A most provocative and constructive discussion of this problem of resolving the dilemma between vocational and university patterns of medical education has

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[1] Macleod, J. Wendell, "Curriculum in Canadian Medical Education", *Canadian Medical Association Journal*, 88:705–712, 1963.

been offered by Dr. John R. Ellis, Physician to the London Hospital and Secretary of the Association for the Study of Medical Education in the United Kingdom. He has suggested that the objectives of undergraduate medical education be defined in terms of the "powers" required by the physician who would serve his community well and be able to keep abreast of advancing knowledge. The content of the curriculum would be worked out secondarily.

He has designated its objectives as follows:

"(1) the acquisition by the student of the power to learn for himself;

(2) the acquisition of a scientific method of thought – i.e., the power to reason and think critically;

(3) the acquisition of competence in clinical method – the technique of obtaining information from patients;

(4) an understanding of the responsibilities of a professional person."[1]

The basic goal of the undergraduate student would then be to learn how to use his mind in scholarly preparation to cope with the health problems of his fellow man. The method of solving problems would take precedence over the mastery of masses of detailed knowledge of uncertain relationship to this process. The faculty's responsibility no longer would be coverage of an encyclopaedic amount of subject matter but the selection of "learning experiences" that would stimulate the student's mental growth by their challenge and their relevance to his own conception of his task. In each phase of the course a basic core of learning experience would be sought for all in a core curriculum. Since students learn at different rates and have different backgrounds and interests and since they are bound to pursue later a variety of professional paths it is obvious that their "non-core" activity might vary greatly. The slower or less secure student could dwell longer on the basic material while his more rapidly moving classmate pursued elective studies to extend his interest and take him into greater depth in the field of his choice.[2]

CO-ORDINATION OF UNIVERSITY EDUCATION AND CLINICAL TRAINING

One must emphasize again the implications of this trend, first in the United States and then in Britain, to move from an undergraduate course that was primarily vocational to one basically oriented towards the university goal of self-discipline

[1] Public Health Papers No.20, *Preparation of the Physician for General Practice*, World Health Organization, Geneva: 1963, p.43. See also Ellis, John R., "The Profession and the People", *Journal of Medical Education*, 39:7–16, 1964, major address at 1963 annual meeting of Association of American Medical Colleges.

[2] Young, Richard H., "Medical Education in the United States", *Journal of Medical Education*, 34: 802–813, 1959.
For discussion of the formulation of educational objectives and their translation into curriculum see:
(a) Miller, Geo. E., *et al*, *Teaching and Learning in Medical School*, Cambridge, Mass.: *Harvard* University Press, 1961. Chapters 7 and 11. This work is the *vademecum* for the teacher interested in medical pedagogy.
(b) Tyler, Ralph W., *Basic Principles of Curriculum and Instruction, Syllabus for Education 360*, Chicago: University of Chicago Press, 1950.

in critical, logical thinking. Our present methods of examination, already subject to harsh criticism, would become quite inappropriate. More imponderable, however, would be the implications for internship and residency training in hospitals. As already mentioned, these phases would have to provide a major part of the vocational preparation of the physician. The learning experience, at this stage concerned chiefly with clinical skills, would have to be complementary to the undergraduate experience and specifically geared to the graduate's future professional role. In neither of these countries, nor in Canada, have even teaching hospitals been organized to conduct a primarily educational programme; except recently in nursing. Both interns and residents perform service functions according to schedules that often bear little relation to their training requirements. Hardly ever have the "training programmes" a set of stated educational objectives with a structured curriculum that would be acceptable to a pedagogically up to date college or high school; or to some of the new or recently reorganized medical schools. The regulations of the authorities that control the enrolment of specialists, whether by approving training programmes or by conducting examinations, appear similarly to be educationally anachronistic. From these observations one should not infer a state of affairs that precludes the possibility of clinical training of high quality. The surmise is that other approaches might increase the number of hospitals in which a good experience is gained. They might also shorten the time of training.

Some of these conclusions emerge from the most recent survey of the internship in a large number of university hospitals in the U.S.A.[1] Many other anomalies are revealed. In some hospitals there is a conflict of interest between interns and senior medical students. There is still more competition between the interns and the resident staff. Departments in certain fields maintain a much keener intellectual atmosphere than others. The committee accorded the specialty boards sharp criticism for their stereotyped requirement of the candidate to spend a fixed number of years in training: if he (the resident) can demonstrate to the boards that his knowledge and judgement reflect superb education in his field, then they should not be overly concerned with the details of the schedule he followed or the length of time it has taken him to acquire his knowledge and skills. A radical revision of hospital staffing concepts is needed, this report stresses. The term *intern shortage* is but "another way of saying that hospitals need someone on continuous duty to provide modern medical care for their patients." The personnel requirement of increasingly technical hospital care cannot be met in all hospitals by means of the training programme. The latter already forfeits much of its educational potential by subordinating training to service. In Britain and on the continent some of this continuous care is rendered by registrars or by full-time junior staff men on adequate salary. Many of our mental hospitals are served in this way. One might predict a trend to extend this pattern to general hospitals whether they are engaged in teaching or not.

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[1] Saunders, Richard H., "The University Hospital Internship in 1960: A Study of the Programs of 27 Major Teaching Hospitals", *Journal of Medical Education*, 36: 561—659, 1961.

With the mood to evaluate every aspect of medical education spreading widely and rapidly one may expect still more extensive studies of the internship and residency and their relation to the preceding university course. Greater co-ordination by the university of the undergraduate, graduate and post-graduate phases of medical education may be expected. A "Saunders Report" in Canada would be invaluable.

The same type of concern for basic educational principles has entered the field of continuing medical education in the past two decades. As will be related in Chapter 9 the formal lecture has been replaced largely by the seminar type of teaching. It is conducted most often in the physician's own setting, the hospital in which he works; and the topics are selected by him on the basis of existent problems in his own practice. This transition in emphasis is well revealed by the reports at intervals from Dalhousie University, the University of Toronto and latterly, the University of British Columbia (see Chapter 9 and Appendix 5). A larger bibliography may be found in the Report of the Joint Study Committee in Continuing Medical Education, initiated in 1961 by the American Medical Association and seven other bodies.[1] It proposed the creation of a nationwide "university without walls" for continuing medical education.

Key issues under current study are these: whose responsibility is continuing medical education – university, medical society or licensing body? Who should pay for the programme? What are the best teaching and administrative methods? How is the efficacy of a programme to be measured? Now that research methods are providing new means of objective evaluation of teaching one can expect a period of critical comparison of old and new approaches in every branch of post-graduate study. An example is the effort by the American Heart Association[2] to determine by controlled observation to what extent physicians' clinical performance is altered by exposure to a particular kind of instruction in refresher courses.

Another trend is to bring into the planning and evaluation of continuing medical education the resources of the behavioral scientist, particularly the educational psychologist. For this reason one may expect closer contact between medical programmes and those in general adult education.[3] In fact, it appears that the educational problems at the undergraduate, graduate and post-graduate levels are not only very similar; they are basically the same problems of learning and teaching that have harrassed the pupil and challenged the teacher in primary, secondary and university education. It is only recently, however, that medical

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1 Dryer, Bernard V., "Lifetime Learning In Physicians – Principles – Practices – Proposals", *Journal of Medical Education*, 37:1–134, Part 2, June 1962.

2 American Heart Association, Committee on Professional Education, 44 East 23 Street, New York 10, N.Y.

3 One benefit to be derived from the best type of adult educator is greater familiarity with simple methods of presenting technical information. For example, a manual for use in community development describes the basic conditions for effective learning in understandable terms like these: *Research tells us that an individual learns best those things he wants to do, those things he is able to do, those things that tie in with what is familiar to him and make sense to him; when he takes an active part in the learning process, when he knows how well he is doing and when he gets satisfaction out of learning.* (Stensland, Per. *Community and Development*, 1–24, Center for Community Studies, Saskatoon, Sask.)

educators have begun systematically to ask what could be learned from experience in these other educational fields. This aspect of the modern movement to study medical education itself is so significant that comment on its development is worth making.

RESEARCH IN MEDICAL EDUCATION

Individual investigators have reported from time to time their studies on one or another aspect of education for the health professions. This interest got under way earlier in university schools of nursing than in medical schools. An early effort to predict academic performance in medical students was reported by a psychologist at the University of Toronto in 1942.[1] Shortly after the war the Association of American Medical Colleges set up its substantial research to measure the intellectual and later the non-intellectual characteristics of medical students. This provided basic data for the notable series of *AAMC Annual Teaching Institutes* begining in 1952 and projected through at least to 1965. Beginning with preventive medicine these have dealt successively with various subject matter areas, problems of students, relations of medical education to medical care, to medical research and to the medical profession and now a series of two on medical school administration.

The potential contribution of the social and behavioral sciences was revealed to many medical faculty members for the first time at the AAMC Institutes.[2] Not only did the conference papers disclose arresting findings on applicants, students, teachers and the educational process itself, there was also the opportunity for medical scientists, clinicians and administrators to rub shoulders in a rewarding way with leaders in these fields. The consequence has been the regular participation of scholars from almost every division of the university and from other walks of life in annual meetings, conferences and symposia. Finally, many medical schools appointed psychologists, sociologists and anthropologists to their own faculties with both teaching and research responsibilities. At the new medical school at the University of Kentucky the first appointee after the dean was the professor to head a department of behavioral science, to join anatomy, bio-chemistry and the others as a *bona fide* basic science.[3] An economist was a full-time professorial teacher in preventive medicine at the University of Western Ontario for some years around 1950 and the University of Saskatchewan gave a similar appointment to a sociologist ten years later. A question to ask is whether Canadian medical schools have identified themselves sufficiently with these disciplines to reap the benefits claimed by others.

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[1] Salter, Mary D., "A Method of Selection of Medical Students Based on Previous Academic Grades and Medical Aptitude Scores", *Journal of the Association of American Medical Colleges*, 17:300—309, 1942.

[2] Two of the most valuable were (a) 1956 — "The Appraisal of Applicants to Medical School", *Journal of Medical Education*, 32: 3—228, Part 2, October 1957.
(b) 1957 — "The Ecology of the Medical Student", *Journal of Medical Education*, 33: 1—262, Part 2, October 1958.

[3] Straus, R., "A Department of Behavioral Science", *Journal of Medical Education*, 34:662—666, 1959.

The next impetus to understand the educational process in the student's and the teacher's task came with a series of institutes on learning and teaching that began at the University of Buffalo in 1955. Teachers from many American and some Canadian schools took part in discussions of educational theory and their own medical school experience under the guidance of the late Professor Nathaniel Cantor, the late Dean Stockton Kimball and Dr. George E. Miller and their colleagues in education, behavioral science and various medical fields. Some of the more or less direct consequences of this stimulus have already been recounted, but a Canadian instance may be cited. Fired with enthusiasm by attendance at such a seminar the chairman of the curriculum committee in the medical faculty at Alberta in 1961 was able to persuade the dean and department heads to go into a long week-end retreat. There they faced up to some of the anomalous gaps between what they thought they were doing for the students and what seemed actually to be the case. In April 1963, the department heads met for two days to plan a systematic evaluation of their objectives, methods of teaching and examination practices. At the close, a major clinical department offered to lay itself "on the block" for complete dissection. A unit for research in medical pedagogy has been set up under the nearly full-time direction of a full professor. Several other schools are moving in the same direction.

The intellectual centre of this movement is the Research Unit in Medical Education at the University of Illinois headed by Dr. Miller. The "bible" in this reform is the text produced by the Buffalo group[1] with the report of a British conference serving as a later testament.[2] The high pitch of interest in undertaking systematic, objective examinations of everything that goes on in a medical school is apparent in most of the research-oriented faculties. The visible evidence is the steadily increasing amount of work to be reported. A full day was devoted to papers on research in medical education at the 1962 and 1963 annual meetings of the Association of American Medical Colleges. At the first of these meetings 16 papers were presented and another 25 were abstracted in the programme. The following year 50 abstracts were printed of which 12 were presented to the meeting. Reports of these in full comprise a special issue of the Journal.[3]

Keeping pace with this burst of investigation, which is reminiscent of so many significant periods of accelerated accomplishment in the physical and biomedical sciences, the Association of American Medical Colleges has set up a Division of Education to conduct research, to assist in organizing seminars and to render other services to the medical faculties. Its first director has proposed a challenging programme which should be relevant not only to medical educators but to the universities and health and welfare services the world over.[4] It will continue

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[1] Miller, G.E., *et al.*, *op.cit.*

[2] Ellis, J.R., Methods of learning and techniques of teaching, In: *The proceedings of the second annual conference of the Association for the Study of Medical Education*, October 15 and 16, 1959, London: Pitman Medical Publishing Co. Ltd., 1960.

[3] "Proceedings of the Second Annual Conference on Research in Medical Education", *Journal of Medical Education*, 39: 97–225, Special Issue, Feb. 1964.

[4] Sanazaro, Paul J., "The Division of Education of the Association of American Medical Colleges: Programs and Proposals", *Journal of Medical Education, 38: 65–71, 1963.*

its present basic studies, e.g., determination of the reliability and utility of faculty ratings of clinical performance; prediction of performance in clinical medicine; problems in selection and counselling of students; the intellectual functions underlying the process of diagnosis; and accurate description of the kind of "physician models" now presented to medical students by clinical faculty. He notes that although there exists now an excellent system for selecting, training and supporting the best talent for careers in research there are no comparable benefits for the future practitioner. New problems to be investigated centre upon learning and patient care. Research is needed to establish the principles necessary for teaching and learning patient care at the medical school level. But, "no one has made a deliberate study of the changing patterns of patient care and the specific factors that have profound implications for numbers of physicians, kinds of physicians, and the specific skills needed best to serve society's and the individual's health needs". This is obviously very much the business of medical schools.

There is neither the space nor the time to present in this report the substance of the major findings of recent or current researches in medical education. However one example will serve to illustrate what can be accomplished by the research method. A loss of interest or even apathy among the students in the final and penultimate years of the traditional curriculum has been mentioned already. Whether this is due chiefly to lack of opportunity to bear responsibility, to insufficient challenge in the teaching or to sheer fatigue among the students is not known. Only recently one medical dean wrote: "In most Canadian schools the final year students are given only limited responsibility they are being taught most of the day, rather than being left on their own with the facilities for supervised learning on the wards and in the libraries and laboratories".[1] Important variations in the attitudes and approaches of teachers have been revealed in studies in Canada and the United States. In six American schools the basic science faculty tended to exhibit more authoritarian or autocratic attitudes than did clinical faculty. Younger teachers in general exhibited more liberal attitudes towards medical education and more appreciative attitudes towards medical students than did teachers over 40 or with more than 15 years of teaching experience. Some medical schools as a whole exhibited a much more liberal attitude towards students and faculty matters than did other schools.[2] With such variations apparent in "faculty climate" it was natural to examine teaching methods from the standpoint of their assisting or retarding the student in his learning. The two studies to be cited represent a major milestone in research on medical education.

One portion of the survey was an observational analysis of faculty teaching practices in the classroom, laboratory, ward and clinic. Extraordinary care was taken to find an objective measure of the teacher's performance that was unrelated to his familiarity with his subject. For example, a 20 point scale was

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[1] MacFarlane, J.A., "Medical Education: Prospects and Problems," *Ontario Medical Review, 28:* 270—273, April 1961.

[2] Rosinski, Edwin F. and Miller, Geo. E., "A Study of Medical School Faculty Attitudes," *Journal of Medical Education,* 37: 112—123, 1962.

developed to represent the teacher's attitude to difference – did he encourage discussion of deviant understanding exhibited by the student; or did he overlook it or suppress it. Other scales dealt with sensitivity to physical setting, use of instructional materials, reaction to students' needs, use of "challenge" etc., seven in all. Again, striking differences were noted between medical schools, between departments, between Ph.D. and M.D. teachers and between full-time and part-time teachers in different settings.[1]

Fortunately for Canada the same author, who has doctorates in both medicine and education, had occasion to spend two years in his native Montreal. The medical faculty at McGill agreed to an examination of the performance of 40 teachers in medicine and surgery in third and fourth year at its two major teaching hospitals. Many of the findings were highly reassuring, particularly the willingness of teachers to co-operate in such a study. Most of them transmitted some sense of friendliness towards their students. There was good use of instructional materials. Most of the teachers made discernible efforts to respect the patient's feelings. On the other hand, although third-year teachers were eager to help their students adapt to new roles in the hospital and gained high scores for their interest in teaching, this was not the case with teachers in the final year. "The fourth year students and their teachers seemed rather disenchanted." There were lower scores than most teachers would expect for attitude to difference, sensitivity to physical setting, reaction to students' needs and use of teaching methods. (Most of the seminars or conferences were best described as modified lectures.)

It was on the Use of Challenge scale that the observations were particularly provocative. Most teachers subscribe to the goal of fostering critical thought and a questioning attitude. Few in this group, however, went beyond asking questions and then passing judgment as to the correctness or incorrectness of the students' responses. "None of the 40 observed teachers was constructively critical of their students' reasoning." One-third challenged their students actively in other ways; to arouse interest, to remove barriers, to consider related problems or to broaden perspectives. But when a student's comments were wrong he was not helped to understand whether he was simply misinformed or whether his *wrong ideas* "reflected misinterpretations of data, premature conclusions from limited data, judgments founded upon faulty premises, confusion of hypotheses with facts, or the substitution of assumptions for data".[2]

The value of this kind of inventory to a faculty eager to improve its performance is enormous. The desire to undertake such studies can be expected to

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[1] Jason, Hilliard, "A Study of Medical Teaching Practices", *Journal of Medical Education*, 37: 1258–1284, December (Part One), 1962.

[2] Jason, Hilliard, *A Study of the Teaching of Medicine and Surgery in a Canadian Medical School*. This was a background paper for a conference on Undergraduate Education for General Practice, Toronto, November 27–29, 1963, organized by the Association of Canadian Medical Colleges and the College of General Practice of Canada. It will appear in the Education Issue of the Canadian Medical Association Journal in April 1964. For reprints write to Dr. Hilliard Jason, University of Rochester School of Medicine and Dentistry, Rochester, N.Y. This study was part of the research activities of the McGill Student Mental Health Service under Dr. R.C.A. Hunter, Psychiatrist in charge.

outstrip the supply of personnel competent to conduct them in the same manner. Nevertheless, close attention to Jason's papers should aid any teacher or department to embark on a self-evaluation of teaching methods that would be rewarding. Before doing so, however, it would be necessary to translate the goals of the school and its curriculum into specific educational objectives. In addition to the particular knowledge, skills, attitudes and habits to be encompassed it is desirable to contemplate the "levels of learning" demanded by each curricular exercise.[1] The same considerations arise when selecting examination methods, whether these be to determine promotion, to evaluate progress in learning (and to assist it) or to measure the effectiveness of a particular approach in teaching.[2] In any case, the era of research into professional education itself which the world is entering promises an abundance of challenge and ample reward.[3]

MEDICAL EDUCATION AND THE COMMUNITY

The need to relate the student and the faculty in a responsible way to the health requirements of the community has been postulated on straight educational grounds. The graduate must understand the setting in which he will work and the faculty must grasp clearly the factors that determine the role required of him as well as the influences that mould his performance. Curiously enough, the various curricular devices that have grown up to foster teaching and research in this realm have included also the vehicle devised to demonstrate "comprehensive medicine – the mobilization of all appropriate available resources for the care of the patient." Its special attributes include an interest in the patient as a person as distinct from his diseases, which implies an appreciation of his life problems and of his setting; an emphasis on promotion of health; continuity of care and its ready availability; and making full and prompt use of special services, e.g., social service or rehabilitation. In the opinion of the majority it cannot be demonstrated in the hospital ward or in the usual out-patient clinic. It requires a special resembling on the one hand an exemplary model of medical practice and on the other hand the atmosphere of the seminar and research laboratory. Again the most convenient account is provided by Dr. Lee.[4]

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[1] Bloom, B.S., *Taxonomy of Educational Objectives*. New York: David McKay Co., 1956. Learning may take place at levels of simple recall of isolated information, interpretation of data, application of principles, evaluation of a total situation, "synthesis of data into an original and meaningful whole," etc.

[2] Canadian medical schools and examining bodies have been slow to experiment with alternatives to the essay type of examination. There is massive evidence to indicate the greater validity and reliability of certain objective methods compared with the prevailing question-answer and essay examinations to measure performance of the kind usually declared to be important in medical or scientific work.
See: a. Miller, Geo. E., *et al.*, *op. cit.* Chapters 12–18.
b. Illingworth, Sir Charles, "'The Multiple Choice' or Objective Examinations – A Controlled Trial," *The Lancet:* i, 1268–1271, December 14, 1963.
c. Hubbard, John P. and Clemans, William V., *Multiple-Choice Examinations in Medicine, a Guide for Examiner and Examinee*, Lea & Febiger, Philadelphia, 1961.

[3] See Chapter 3 for references to research on the medical student conducted in Canadian universities. Future possibilities are described in Badgley, Robin F., Anderson, Donald O., Hetherington, Robert W. and Riches, Eleanor, " A Prospectus for Canadian Studies in Medical Education", *Canadian Medical Association Journal* 88:690–693, 1963.

[4] Lee, Peter V., *op. cit.*, Chapter 3: *Teaching Comprehensive Medicine*.

Four classical demonstrations of comprehensive medicine in the teaching situation have been provided by four medical schools – Cornell, Colorado, Temple and North Carolina. Although all share a common goal each has its distinctive features stemming from differences in setting, in prevailing problems and opportunities and in the orientation of local faculty leaders. All four used a controlled practice in which the skills of more than one kind of professional were used, e.g., internist and psychiatrist, social worker and public health nurse. Each carried out original research on patient care and/or the response of the students to the programme. An elaborate evaluation was conducted in one case by a team from another university.

Each faculty was a pioneer in its own field of emphasis: at Cornell, in exploring the sociology of medical education, in establishing research on the care of patients as an academic discipline and in giving promise that by "objective analysis some aspects of the art of medicine can be made scientific"; at Colorado, to make a controlled study of an educational experiment using refined techniques to measure the responses of students; at Temple, in a truly patient-centred clinic to study the nature of the doctor-patient relationship and to give students a practical experience in dealing with the total person irrespective of the type of illness; and at North Carolina, where an interdepartmental ambulatory clinic is the focus of the medical school in its service to the state, there is a splendid example of faculty co-operation and of operational research on the daily tasks of teaching students and treating people. At each of these universities, experience with the teaching-research unit in comprehensive medicine has prompted secondary improvements in other parts of the curriculum and in other fields of patient care. Intimate contact by future practitioners of medicine with studies concerning the improvement of patient care must be a valuable stimulus to competent performance and to an attitude of critical enquiry.

In Chapter 4 reference will be made to arrangements at Birmingham, Edinburgh and Manchester where the university also has assumed responsibility for a limited medical practice for educational purposes. The trend is to have a segment of normal family practice under curricular control for specified objectives along the lines described by Lee; and to render to its members an exemplary pattern of comprehensive care. It seems likely that these efforts will be the responsibility of the department teaching public health or preventive, social or community medicine as the term may be, rather than of a university department of general practice. Family doctors however would be essential members of such a unit, along with representation from epidemiology, clinical branches, biostatistics, the social sciences, public health administration, public health nursing, social work and nutrition.

In addition to this kind of responsibility for medical care, in the demonstration and research setting, medical schools are tending to seek contact for their students and faculty with clinical situations in which resources are more limited. The rural preceptorship whereby the medical student gets the feel of a good physician happily at work in a good community is one example. Another one is participation by the faculty in attack on the staggering health problems

of the nations undergoing rapid social change with limited resources at hand. In Canada this activity has barely begun but it promises compensations other than the great satisfaction of helping those in need. With emphasis thrown on the distinction between essential services and the trimmings, this experience may help to clarify Canadian thinking on the objectives and methods of both medical care and medical education. For example, are there more economical yet satisfactory methods of rendering health care than we know now? With our own swelling population and limited supply of personnel this question is highly relevant.

In the long run, however, medical education will not make its full contribution to society until the scholarship of its teaching and research personnel is organized to examine the problems of society brought squarely into focus at the academic level within the university. It is the intellectual consideration of problems that is the first step – the refining of issues in the light of the accumulated literature; the systematic gathering of data, using the experience of epidemiology; the framing of the hypothesis, and testing it in experiment; and finally, the effort to evaluate activities or performance in the most objective manner possible. It is not enough to send a student to live with a rural practitioner, or a resident to work in a family or home-care project. It will have limited value unless the experience is discussed in depth in an organized conference at the academic level.

The other requisite is an attitude of responsibility towards the problems of the community with an appropriate participation in efforts to solve them. Here the history of medicine will record a double swing of the pendulum. Until 50 years ago most medical schools hampered the flowering of scholarship and research by requiring their teachers to cope with an excessive service load in the wards and out-patient departments of their hospitals. The corrective reaction, accompanying the expansion of research, was to withdraw from as much service responsibility as possible; thinking only of enough "clinical material" to meet standard teaching and research needs. This tended to divorce the teacher ideologically from the community, resulting in the much criticized "ivory tower" atmosphere of some departments and medical schools. The four programmes described by Lee and the others mentioned, all represent the compensating trend to relate the university in its teaching and research roles in a responsible and substantial way to the welfare of society.

Since the Conference on the Teaching of Preventive Medicine at Colorado Springs in 1952[1] there has been increasing emphasis on the concept of *social medicine* as an academic field for development by the university.[2] "The application of medical knowledge to man in his social state" and the application of

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[1] Clark, K.E., ed., "Preventive Medicine in Medical Schools," The Report of the Colorado Springs Conference, November 1952, *Journal of Medical Education*, 28: 1 (October, Two), 1953.

[2] Robertson, A., "The Place of Social Medicine in the Medical Curriculum", *Canadian Medical Association Journal*, 82: 724–726, 1960.
Robertson, A., "A Commentary on Sociology in the Medical School", *ibid.*, 83: 703–704, 1961.
Badgley, R.F., "Sociology in the Medical Curriculum", *ibid.*, 83:705–709, 1961.

the newer knowledge of social process to the problems of health and disease comprise a broader field than that usually denoted by "public health". It includes the emphasis on prevention, the techniques of which are taught more and more by clinical specialists, as are also the social aspects of individual diseases. Social medicine attempts a scientific description and analysis of the social and environmental factors that determine the health status of an individual or a nation. More than that it is concerned with the definition and the over-all impact of all the resources of medicine and science on the health problems of society. A university department with these goals would be bound to concern itself also with the over-all impact on the student of his total educational experience; is it fitting him to play his part as a member of a health team, perceiving his professional problems in the context of today's world and tackling them with all the resources of our time? Further elaboration of this subject and a discussion of the more recent developments in Canadian universities will be presented in Chapter 4.

THE ASSOCIATION OF CANADIAN MEDICAL COLLEGES

It must not be inferred that during the period of ferment in the United States, Canadian medical education was idle. The Association of Canadian Medical Colleges was formed in 1943, with a view to advising the Government of Canada on steps to be taken to provide the armed services with needed medical officers and, at the same time, to protect the quality of teaching and to insure proper graduate instruction when the war was over. Its principal officers were a president (a dean) and an honorary secretary.

When in 1957 it was plain that the Government of Canada would establish a National Hospital Insurance Scheme, a delegation from ACMC met members of the Cabinet to press for the maintenance and improvement of teaching facilities in their hospitals. Many representations were made to the provincial and national departments of health and meetings were held with representatives of the teaching hospitals. It is gratifying to recognize that teaching units have now been established in the provincial teaching hospitals and a more liberal allowance made for the support of out-patient clinics.

In 1957 the ACMC as a delegation met members of the Cabinet of the Government of Canada, asking that greater support for research in medicine be provided. In response, the Government appointed a committee to advise it on this question, under the chairmanship of Dr. R.F. Farquharson. The report of the Committee was presented within two years; the medical budget of the National Research Council was increased; and in 1960, the Medical Research Council of Canada was established with the promise of substantial annual enlargements of its budget. Twice in 1962, delegates from the ACMC met the Chairman of the Committee of the Privy Council on Scientific and Industrial Research to urge the implementation of a recommendation of the "Farquharson Committee", that large grants be made for the creation of research facilities in the medical schools and teaching hospitals. The total amount now considered to be necessary is of the order of $70 million (Table 12-1).

By 1957 it was obvious that the business of the ACMC was so voluminous that a permanent secretariat on medical education for Canada should be established. Conferences were held with representatives of the Royal College of Physicians and Surgeons of Canada and of the Canadian Medical Association; these latter bodies agreed that the ACMC should be the sponsoring body. The ACMC was incorporated in 1961; the W.K. Kellogg Foundation made a liberal grant to support the secretariat for three years and in Februray 1962 an excutive secretary was appointed. The ACMC is now an Associate Committee of the Canadian Universities Foundation and shares its offices.[1]

In 1952 the Association recommended that its component schools invite the ACMC and the AMA to renew their periodic inspection of Canadian schools and since that time one or two deans from schools other than the one being inspected have become regular members of the survey team and the president of the ACMC accompanies the team visiting one of the American schools.

Throughout its life the ACMC has been attentive to changes in medical education. For several years, at each annual meeting, one day was devoted to discussing current trends in one of the disciplines; indeed all the major fields were covered, from the basic sciences through the clinical departments to public health.

Since the secretariat was established, joint conferences in medical education have been held with the College of General Practice and certain of the individual universities. A research social scientist has been engaged; beginning in June 1964, he will collaborate in and enlarge on two studies now in progress – viz. (1) A Study of Supply of Faculty in Medical Science Departments, (2) An Analysis of the Costs of Medical Education in Universities and Teaching Hospitals.

The ACMC has discharged a national role of great importance. It is the educational organization which has official relations with the Canadian Medical Association, the Royal College of Physicians and Surgeons of Canada, the Medical Council of Canada, the Association of American Medical Colleges and the American Medical Association.

It is the organization to which the Government of Canada has appealed on questions of supply of medical manpower, and of education in the medical aspects of Civil Defence.

It is the organization which speaks to federal government authority on the effect of social legislation on medical education, and on the latter's need of support for research and training programmes in medicine.

It is the only body which can co-ordinate medical education in Canada; it constantly reviews and advises on standards.

SUMMARY

Medical education reflects at every stage in its evolution the state of scientific development of its subject matter, the methods of practice of its crafts, the social resources that support education and technology, and the expectations

[1] "A Canadian Secretariat on Medical Education," *Canadian Medical Association Journal* 86: 882–883, May 12, 1962.

and needs of society itself. Similarly, what a faculty or curriculum can accomplish depends in some measure on the expectations brought by the student to his studies and on the expectations of the society that receives him later. Medical education is bound to be involved in innovation as well as in preservation of the continuity of useful tradition.

Medical education can never be exclusively national. The centre of gravity of scholarship migrates, and scholars sooner or later find their way to those places where excellence and relevance prevail. Canadian medicine has enjoyed a rich heritage from Britain and France, and latterly from elsewhere on the Continent and from the United States. The growth of "university medicine" emphasizing organized, basic research by full-time scientists, and the teaching and investigation of clinical medicine by scholars protected from excessive service responsibilities began in North America in 1890 at the Johns Hopkins Hospital in Baltimore but reached its full flowering between 1915 and 1930. Aided by the migration of scholars and large-scale government support of research and training programmes after World War II, scientific medicine in the United States has undergone an enormous expansion. Contributing to this, as well as being stimulated by it, has been an unprecedented ferment of interest in the problems and tasks of medical education.

In Canada, Britain and France, similar developments have been taking place on a smaller scale and after varying intervals. The possible causes of Canadian lag have been discussed with questions raised which bear on the future direction and rate of growth of Canadian medical education. Since the mood of the current movement encourages experimentation and a diversity of approach, Canada's great regional and cultural variations lend themselves advantageously to participation in this ferment.

Problems created by the massive growth and increasing complexity of medical science have been compounded by new requirements of society. Fragmentation of knowledge, isolation of disciplines, depersonalizing tendencies in medicine and the consequences of exclusively hospital-based clinical teaching have called for re-examination of educational objectives by all the health professions. At the heart of the new movement in medical education is the more deliberate effort to define its tasks and to use scientific method in devising new approaches and selecting those most appropriate to use.

A new development, therefore, has been the use of research methods to scrutinize every aspect of the educational process, e.g., the characteristics of the students themselves, methods of selecting students and of predicting their performance, the application of theories of learning to teaching methods, the validity and reliability of examination procedures, the factors influencing choice of career and of future training, the nature of experience in the hospital internship and residency, the attitudes and performance of faculty, the administrative procedures in a medical school, the cost of all the programmes in which faculty members participate and the cost of medical education in the teaching hospitals. Efforts are being made here and there to evaluate the performance of the graduate

in various professional roles. This is essential to planning an appropriate curriculum of undergraduate and post-graduate study.

The main departure in the undergraduate curriculum has been to move from the goal of "subject matter coverage" to development in the student of ability to think critically, to discern problems clearly and to possess a method of approach towards them, to be able to learn on his own and to draw upon new scientific knowledge with discrimination. In addition, fresh emphasis is being placed on his gaining an understanding of the responsibilities of a member of the profession of medicine and an appreciation of the society he will serve. Examples have been given in some detail to illustrate the varied and often radical manner in which this liberation of medical studies is taking place.

The main dilemma in curriculum in medical schools concerns the extent to which the undergraduate period is to be used to communicate the knowledge and skills of current medical practice. In specialty fields it is customary to take from four to five years of additional training. Yet the family physician, whose role is acknowledged to be both important and difficult, is required to have only one year of internship and seldom takes more than two. Many suggestions have been advanced that wider practical experience be included in the undergraduate period. The new educational philosophy however, would act to limit the undergraduate teaching to a more basic kind of education. This contest between university-type education and professional training will have to be resolved. If the former wins out, as seems to be the trend, then great changes will be required in the arrangements for a more specifically vocational post-graduate experience, both in the hospital period and while in practice.

In the new experiments in medical education, stress has been placed on the twofold goal: "to teach medicine as a meaningful whole and to emphasize from the beginning of the course the purpose of medicine – to deal helpfully with people". The latter objective has called for new types of clinical teaching and research facilities in the way of family care units, comprehensive medical care clinics and special types of association with the practising medical profession and the health agencies in the community. With the accelerated development in Canada of universal hospital insurance and medical care plans, it may be possible to engage in an even greater diversity of experimental projects to teach and do research in community medicine. The evaluation of such efforts and of some aspects of medical education within the university and the teaching hospital will require additional personnel trained in the research methods of the social and behavioural sciences and education.

The opportunity is noted in Canada for an effective approach to the many problems of medical education through the Association of Canadian Medical Colleges with its affiliation to the Canadian Universities Foundation and its close relationship to the Canadian Medical Association, the Royal College of Physicians and Surgeons of Canada, and its prospect for rewarding collaboration with L'Association des médecins de langue française du Canada, the College of General Practice of Canada and similar organizations.

CHAPTER 3

THE MEDICAL STUDENT

> "To pursue science is not to disparage the things of the spirit — in fact, to pursue science rightly is to furnish a framework on which the spirit may rise."[1]

It may be helpful to preface a discussion of the Canadian medical undergraduate with some comment on the secondary school educational system as it exists in Canada and the relationship of secondary education to the universities. Each medical school in Canada is a faculty of the parent university and consequently is bound by its admission standards. Several years ago it was not uncommon for a university to set its admission standards by its own special examination. More recently, however, this privilege of examining candidates who wish to qualify for admission has been delegated to Provincial or College Boards. In most provinces the universities co-operate with provincial departments of education in arranging examinations which, on the one hand, mark the termination of the student's experience in a high school or collegiate of the province, and on the other hand permit the universities to judge whether the student has achieved a sufficiently high academic standard to enter the course of his choice. In the Province of Quebec there are as well as those high schools and collegiates which are under the control of the provincial authorities, several institutions, known as "Collèges Classiques" which are administered by religious orders.

Of course, the universities may also receive applications from students who have achieved their secondary school education in other countries, or through various courses other than those prescribed by their respective provincial education authorities. The universities still maintain the right to measure the educational standards which these students have achieved and equate them with the regular standards of admission.

In this country the students who expect to study medicine have taken preparatory courses in physics, chemistry, mathematics and in some instances zoology and botany, as well as a language other than English, in the English-

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[1] Bush, Vannevar (President of Carnegie Institution of Washington, 1939—55), "The Search for Understanding", Address at Eli Root Hall, December 11th, 1952.
Reported in the Institution's *Yearbook*, 1952—53.

speaking part of the country, and a language other than French in the French-speaking part of the country. In most instances he will be asked to take further work at the university before beginning his professional studies. To meet these requirements he must either spend two years in a so-called pre-medical course (where he engages in further study in physics and chemistry, biology and various options in the humanities), or take a full degree course in a Faculty of Arts and Sciences. In the Province of Quebec a provincial statute requires that candidates for admission to Laval and the University of Montreal must have the Bachelor's degree from an affiliated college or its equivalent; an additional pre-medical year is required for those who have not qualified in physics, chemistry and biology. For admission to McGill University, the student must have credit for three years of university work succeeding junior matriculation in that Province. All French-speaking students receive a much more thorough grounding in the study of Latin and Greek than do those in the English-speaking part of Canada. Latin is no longer a compulsory subject for admission to the medical course, except in the Province of Quebec. On the other hand, in French-speaking Canada not all classical colleges have the facilities to enable the students to come properly prepared in physics, chemistry and biology. It is therefore not unusual in the French-speaking universities for such students to be asked to take a special year in the Faculty of Science, studying intensively in these particular fields.

There is no doubt that we have been strongly influenced in Canada by admission standards and practices in the United States. In that country secondary school education is completed, on an average, in one year less than in Canada, and for several years medical schools have favoured as an admission requirement a four-year degree course in one of the many colleges which prepare students for professional courses. In the United Kingdom, on the other hand, the first M.B. examination, the course content which is equivalent in a general way to what we would call pre-medical education here, can be taken by the student directly from his secondary education institution, whether it be a special high school, grammar school, or an English public school, but preparation for it requires on the average two years beyond the regular work for the general leaving certificate of education.

The examination consists of tests in physics, zoology and chemistry. If the student cannot secure the proper instruction in his high school, he may receive the necessary instruction in the medical school, or attend classes in the Faculty of Science of the parent university.

Here in Canada we have felt that, ideally, the student should be asked to come to his first professional year with sufficient grounding in chemistry, physics and biology that he can begin the study of biochemistry, physiology and anatomy, and we have hoped that, through some means, he will have had an opportunity of learning something of the humanities and the social sciences beyond that which is available to him in high school. The question of time is of some importance. Education at the secondary school level is a demanding and complex task. It gives little time or opportunity for experiment, and the average student will be 18 years of age before he has matriculated. If we are to continue to require of him another two, three or four years pre-professional preparation,

four years of professional studies, a minimum of one year's internship before he can be licensed, he will be 25 to 27 years of age before he is qualified to practise, and if he decides to take qualifications in a specialty, he will be 30 years of age or more before he engages in practice, teaching or research. It is difficult to know where acceleration might be effected. If it were possible to arrange two levels in the secondary school programme, one for those students who wish only a certificate of secondary school education and the other for those who are capable and ambitious to go to university, the secondary school training for the latter group might be extended to prepare the matriculant to enter the first professional course in medicine and to begin immediately the studies of anatomy, physiology and biochemistry. Something of this pattern is available in Sweden, where the gymnasium student decides about the age of 15 that he desires to go to university and that he wishes to study the natural sciences. Having completed his course in the gymnasium, he is eligible to apply directly for medicine. There are those who say that no student should begin the study of medicine until he has had an opportunity to mature either by study of the humanities at the university level or in the more rigid sphere of work in the

TABLE 3–1

MEDICAL ENROLMENT IN CANADA BY YEAR OF COURSE

1947–48 to 1962–63

Year	Year of course				Total enrolment	Medical graduates
	First	Second	Third	Fourth		
1947–48	827	842	756	675	3,100	632
1948–49	887	765	842	739	3,233	679
1949–50	897	798	761	822	3,278	791
1950–51	960	880	944	805	3,488	858
1951–52	873	891	858	836	3,458	783
1952–53	918	809	865	852	3,444	825
1953–54	982	901	844	916	3,643	896
1954–55	968	903	881	837	3,589	894
1955–56	1,035	883	877	856	3,651	816
1956–57	1,001	934	855	865	3,655	893
1957–58	1,012	916	928	830	3,686	836
1958–59	986	911	867	904	3,668	859
1959–60	946	882	863	858	3,549	863
1960–61	970	842	853	843	3,508	834
1961–62	1,006	857	808	854	3,525	
1962–63	1,057	904	831	805	3,597	
Total	15,325	13,918	13,533	13,297	56,073	
Each Year or % of Total	27.3	24.8	24.2	23.7	100.0	

Source: Educational Issues of the *Journal of the American Medical Association.*

outside world or— as was the case in World War II — through the demanding experience of leading a disciplined life in association with his fellows. There are sound arguments, however, for believing that the study of medicine is in itself a study in the humanities and that it may provide a maturity superior to some of the two-, three- or four-year courses of preliminary college experience. We were interested to note the experiment taking place at the Northwestern University in Illinois. Here a small number of high school graduates of unusual ability are brought to the university, where the Faculty of Medicine co-operates with the Faculty of Science, to give them an accelerated course which will allow them to proceed to the professional study of medicine after two academic sessions, instead of the four years leading to the baccalaureate. An experiment is now being undertaken at McGill, where a small number — 25 students — is being selected at the junior matriculation level and, in association with the Faculty of Arts and Science, admitted to a combined course which will allow them to finish in seven years with a degree in Science and a complete degree programme in the Faculty of Medicine.

Other experiments in special arrangements to accelerate entrance to the medical course are being undertaken at the Johns Hopkins and Boston Universities. Not only is a very careful effort being made to offer good students an opportunity to proceed more rapidly towards the final goal of serving the community as doctors, but new and imaginative programmes devised after the most careful study, in co-operation with the Faculties of Arts and Sciences, aim to stimulate the student's interest in the modern scientific approach to the study of health, and to maintain his interest in the application of modern scientific medicine in practice.

The early development of medical education in Canada was strongly influenced by the medicine of Great Britain and continental Europe — notably France. With the easement of tensions following the War of 1812, the improvement of transportation and communication, it was inevitable that there should be an ever increasing exchange of knowledge and ideas with the United States. In the published papers delivered at what was perhaps the first post-graduate course of lectures in the Medical Faculty of the University of Toronto, in December 1890, the names of two distinguished Americans, Albee of New York and White of Pennsylvania, appear together with seven members of the local faculty. But the tendency to develop trade schools of medicine so manifest in the United States did not spread to Canada and although the Flexner Report of 1909 had a profound influence on Canada— the results were not as spectacular as in the U.S.A. where dozens of schools were closed and the course of medical school university alignment was firmly charted for the future. In Canada with one or two exceptions medical education had developed in relation to pre-existing universities. Students seeking to study medicine were admitted according to prevailing university standards and proceeded to their degree in a three-, four-, five- and, finally six-year course which was planned by the Faculties of Medicine in association with the teachers in the Faculties of Arts and Science.

Following World War II the Canadian schools, stimulated by close association with their American colleagues in the Association of American

Medical Colleges, began to examine their curricula, and particularly the criteria for entering the professional courses in medicine. The schools of the United States favoured a full degree programme in a liberal arts college as a requisite for admission. Gradually in Canada the old idea of an integrated course of six years was modified to a preparatory period of two years in an arts college following senior matriculation (or a full degree programme) followed by four years of study in the professional course. It is now interesting to see the reversal of trends in these experimental courses in the schools of the United States, with efforts to shorten the number of years of undergraduate study, and to arrange integrated courses, with Faculties of Arts, which will be particularly suitable for the professional studies in Arts and Medicine but he will do it in seven years after leaving his high school. The Boston student will finish the work for his M.D. degree in six years after leaving high school.

Where does this leave us in Canada? Is it impossible or unlikely that a student can be adequately prepared for the entrance to the professional studies of a medical course in the secondary educational systems of our country, even with one more year in high school than his American cousin? This has been the assumption during the past 20 years in English-speaking Canada, while in the United Kingdom and continental Europe the majority of medical students have proceeded to medical school after completing their secondary education, provided they have been able to secure adequate instruction and show adequate standards in mathematics, science and their own language. The total time spent in primary and secondary education up to senior matriculation is from 11 to 13 years. And yet this is still apparently an inadequate preparation for admission to the study of medicine. Have we gradually increased the number of years spent in primary and secondary education in an effort to accommodate an increasing number of average or lower than average students? If there is to be acceleration in the rate at which good students may hope to complete their professional studies, surely it must take place in either the primary or secondary programme. It is unlikely that the basic studies of medicine, with an ever increasing body of knowledge in medicine, can be accomplished in less than four calendar years, even although elsewhere in this report the reader will note recommendations for the elimination of at least one of the regular summer vacation periods. We believe that there should be careful studies made on the best methods to save

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Note: Since this section of the Report was written there has appeared in the literature two other reports of interesting experiments in medical education. Three working parties in England (under the chairmanship of Professor Tunbridge, Sir Harry Platt and Sir Charles Morris) have been discussing the foundation of a new medical school to be coupled with a school of human biology. The reports now available deal with a proposed B.Sc. course in human biology, the new clinical course, and the administration, background and structure of the new school. Sites which are named as suitable are the universities of Warwick, Hull, Nottingham, Keele and Southampton. Copies of the report are available from the secretary of the Steering Committee, Dr. Nicholas Malleson, 2 Woburn Square, London, W.C. 1, or the Association of Canadian Medical Colleges, 75 Albert Street, Ottawa 4.

Pennsylvania State University and Jefferson Medical College have recently planned a co-operative experimental course which will cut three years from the time normally required from college entrance to the awarding of a medical degree. Twenty-five students who have been specially selected should emerge at the end of 5 calendar years with the degrees of B.S., M.D. Both Universities will continue their regular premedical and medical curricula.

one or two years either in the secondary programme, or in so-called preprofessional courses. This will require the examination of possibilities, both with Departments of Education and with the Faculties of Arts and Science at the university level. Certainly the results of the American experiments will be watched with interest, but it is to be hoped that we may develop programmes to suit our own needs.

RECRUITMENT AND ADMISSION PRACTICES

There was little restriction in numbers of students in any of the medical faculties of Canada until the latter years of World War II. But at the time most of the medical schools decided, in the expectation of great numbers of applicants

TABLE 3–2

GRADUATES OF CANADIAN MEDICAL SCHOOLS
per 100,000 Population, 1911 – 1961

Year	Medical graduates	Population '000	Medical graduates per 100,000 population
1911	307[1]	7,207[2]	4.3
1921	364[1]	8,788[2]	4.1
1931	475[1]	10,377[2]	4.6
1941	562	11,507[2]	4.9
1942	539	11,637	4.6
1943	496	11,795	4.2
1944	523	11,958	4.4
1945	769	12,102	6.4
1946	513	12,283	4.2
1947	567	12,558	4.5
1948	632	12,859	4.9
1949	679	13,447	5.1
1950	791	13,712	5.8
1951	858	14,009[2]	6.1
1952	783	14,459	5.4
1953	825	14,845	5.6
1954	896	15,287	5.9
1955	894	15,618	5.7
1956	816	16,080	5.1
1957	893	16,610	5.4
1958	836	17,080	4.9
1959	859	17,483	4.9
1960	863	17,870	4.8
1961	834	18,238[2]	4.6

[1] Three-year average (including preceding and following year).

[2] Census data: 1942 – 1950 and 1952 – 1960 population figures are based on Dominion Bureau of Statistics intercensal estimates of population as at June 1 for the years concerned: Population Estimates, Age and Sex, September 1962, D.B.S., Census (Demography) Division, Reference Paper, Catalogue No. 91–506.

Source: Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964.

following the termination of the War, that they should forthwith determine the maximum number of students for which they could provide adequate opportunities and facilities, and limit their admissions accordingly. Since that time there has been very little change in the numbers set as a maximum. Indeed, not always have these limits been reached. As soon as the rush of applications from returning servicemen and large numbers of other applicants(who frequently had to postpone their admission for one, two or three years) had been somewhat exhausted, there was a falling off in the numbers of applicants for medicine, even though since 1945 two new schools have been opened, and one two-year school has been extended to a full four-year programme. Table 3–1 shows that there were 1,012 students in the first professional year of medical schools in Canada in 1957-58. This number dropped in 1959-60 to 946. It began rising again the following year, and in 1960–61, 970 students were registered in the first professional year. In the session 1960–61 there were 3,508 students in all years in all the medical schools in Canada, which was the lowest figure for several years, reflecting the reduced admission rate since 1957. The admission figures for the session 1962–63 for the first professional year show a total of 1,057, which is approximately a five per cent increase over the previous year. Table 3–4 shows

TABLE 3–3

MEDICAL STUDENT ENROLMENT AND TOTAL UNIVERSITY STUDENT ENROLMENT PER 100,000 POPULATION, CANADA, 1947/48 – 1960/61

Year	Medical student enrolment[1]		Total university student enrolment		Total university student enrolment minus medical student enrolment		Population 1,000
	No.	Per 100,000	No.	Per 100,000	No.	Per 100,000	
1947–48	3,100	24.7	78,205	623.1	75,105	598.4	12,551
1948–49	3,233	25.2	74,797	583.3	71,564	558.1	12,823
1949–50	3,278	24.4	68,480	509.3	65,202	484.9	13,447
1950–51	3,489	25.4	63,942	466.3	60,453	440.8	13,712
1951–52	3,458	24.7	59,634	425.7	56,176	401.0	14,009
1952–53	3,444	23.8	59,826	413.8	56,382	390.0	14,459
1953–54	3,643	24.5	60,737	408.9	57,094	384.4	14,845
1954–55	3,589	23.5	64,669	423.0	61,080	399.5	15,287
1955–56	3,651	23.3	68,768	438.0	65,117	414.8	15,698
1956–57	3,655	22.7	72,624	451.6	68,969	428.9	16,081
1957–58	3,686	22.2	80,443	484.3	76,757	462.1	16,610
1958–59	3,668	21.5	88,006	515.3	84,338	493.8	17,080
1959–60	3,549	20.3	94,928	542.9	91,379	522.6	17,483
1960–61	3,508	19.6	105,911	592.7	102,403	573.1	17,870

[1] Excludes pre-medical and post-graduate students.

Source: Medical student enrolment has been computed from the Educational Issues of the A.M.A. Journal. Total university student enrolment has been computed from the files of Higher Education Section, Education Division, Dominion Bureau of Statistics.

that there was a considerable increase in the number of applicants for the session 1962–63; all available places in Canada were filled. In the Toronto area, the sudden increase in the number of well qualified applicants for the pre-medical course, where the number is limited to 125, has been a cause for concern, and there has been urgent enquiry about what is being done to relieve the situation so that well qualified applicants can pursue their objective of studying medicine.

Whatever causes for optimism may be found in the increased number of applicants, it is obvious that the total number of students studying in Canadian medical schools has not increased to the same degree as has the general student population. This is graphically illustrated in Tables 3–2, 3–3 and 3–4. Table 3–3 shows that the medical student enrolment per 100,000 population has dropped from 25.4 in 1950 to 19.6 in 1960, whereas comparable figures for the general student population have increased from 466.3 to 592.7. Table 3–4 shows comparative indices, taking 1953 as 100.

The whole question of recruitment is rather involved. For several years after World War II it seemed that no-one could get into the medical faculty unless he matriculated with first-class honours. Moreover, it was generally known that it was an expensive course and that when the student had finished secondary school he must take at least two years of university work, and then meet the admission standards of the first professional year in the particular

TABLE 3–4

INDEX OF MEDICAL STUDENT AND TOTAL UNIVERSITY STUDENT ENROLMENT
(1953/54 = 100)

Year	Medical student enrolment	Total university student enrolment	Total university student enrolment minus medical student enrolment
1947–48	85.1	128.8	131.6
1948–49	88.8	123.1	125.3
1949–50	90.0	112.8	114.2
1950–51	95.8	105.3	105.9
1951–52	94.9	98.4	98.5
1952–53	94.5	98.5	98.8
1953–54	100.0	100.0	100.0
1054–55	98.5	106.5	107.0
1955–56	100.2	113.2	114.1
1956–57	100.3	119.6	120.8
1957–58	101.2	132.4	134.4
1958–59	100.7	144.9	147.7
1959–60	97.4	156.3	160.1
1960–61	96.3	174.4	179.4

Source: Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, Chapter 3, Table 3–7.

school which he had selected. There followed four years of what was currently believed to be a very difficult course, and following graduation a further year at internship, before the candidate was allowed to practice. Additionally, as noted in Table 3–5, the fees in the medical course were higher than in any other faculty in the university, and summer vacations were not sufficiently long to enable the student to earn more than enough money to cover these fees; indeed he was fortunate in recent years if he was able to do that. In the meantime there were the attractions for the good science student in the newer branches of physics and chemistry, and as will be noted elsewhere in this Report, if the student was sufficiently gifted to do well in one of the honour courses in the natural sciences, he was almost sure to be subsidized through the National Research Council or other agency if he decided to proceed in the graduate school to a master's or a doctor's degree.

These are some of the factors that operated to produce what we believe was a temporary reduction in the number of applications. The practising doctors themselves were not always enthusiastic recruiting agents; they talked vaguely to young high school students about the changes in medicine, about the changes in the economic features of it, of what might happen when hospital and medical care insurance were introduced. We have reached the time when the exciting possibilities of careers in medicine should be put more attractively before the young men and women who are coming to the end of their high school careers. This is being done somewhat more effectively than was the case five years ago. The Canadian Medical Association is to be commended on its attractive brochure entitled "Careers in Medicine". The financial question poses a problem, however, particularly if the student lives beyond commuting distance of the university, and must find money, not only for his fees, but also for his daily maintenance, clothing and other expenses. Here in Canada, we have made education free up to the end of the secondary school programme. We have even

TABLE 3–5

COMPARISON OF TUITON FEES IN 12 CANADIAN UNIVERSITIES
1961 – 1962

University	Engineering	Medicine	Arts and Science	Dentistry	Pharmacy
Ottawa	490	550	400	N.A.	N.A.
Laval	400	535	350	N.A.	400
Montreal	400	525	425	475	450
McGill	525	600	450	500	N.A.
Queen's	525	550	410	N.A.	N.A.
Toronto	657	707.50	466	659	499
Western Ontario	550	679	465	N.A.	N.A.
Manitoba	400	500	300	425	350
Saskatchewan	350	475	225	N.A.	250
Alberta	340	525	290	425	290
British Columbia	396	551	346	N.A.	396
Dalhousie	520	500	465	450	465

insisted that all students, whether particularly well qualified or not, must go to school to the age of 16. When it comes to higher education, the picture presents a startling contrast: there are fees for every course and, as has already been pointed out, in medicine they are particularly high. There is a rather patchwork arrangement of scholarships, bursaries and loans, but it must be particularly frightening to the parents of gifted children who live in small towns or villages on the average worker's income, to contemplate financing of one or more of their children through five, six or seven years of study at a university.

TECHNIQUES OF SELECTION

In those schools which have a specially planned pre-medical course and where the registration takes place in the Faculty of Medicine, even though the teaching is done in the Faculty of Arts, there is some difficulty in selecting students on other than academic standing. There is too little time to interview all the applicants between the date of the publication of the results of senior matriculation examinations and the date set for registration. One university has recently offered provisional registration to 50 or 60 students on the basis of the head masters' and senior teachers' recommendations, and on the standing that the student has enjoyed up to the level of junior matriculation. His final registration, of course, has to be conditional on his making satisfactory standing on senior matriculation examinations. These provincial examinations provide one standard against which all students in the province may be measured, but they do not recognize that since in small schools of the province it may be difficult to get, e.g., the skilled mathematics teacher here, and a good chemistry teacher there, the standard of teaching may not be uniform.

When it comes to selecting students for the first professional year, the selection committee will have available the student's record at college or university for at least two years. That record will include not only his academic achievements, but his interest in other spheres, such as sports and student activities, and the assessment of his capabilities by university teachers. In most instances, it will be possible to interview him. Not all educators believe an interview is of value, but most schools use it. Interviewers on the whole seek those students who have the academic capabilities, who have soundly based motives for study in the medical sciences, who are likely to contribute in research and scholarship, and particularly those who will be suitable for one of the many fields of practice. Indeed, above all, they seek young men and women of integrity – a virtue not easily discernible by interview or any other series of tests or examinations.

Macleod and Thompson[1] wrote as follows: "Basically there has been little change in the selection process. Although four schools now require applicants to have taken the Medical College Admission test, it is still too early to assess its full value for Canadian student selection. Little use has been made of interest inventory or other tests designed to indicate

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[1] Macleod, J.W., and Thompson, J.S., "The Changing Scene in Canadian Medical Education", *The Journal of Medical Education*, 36:1079–1091, 1961.

personal suitability for medical sciences. Most schools rely chiefly upon academic average in pre-medical years. The use of personal interviews is general although most chairmen of selection committees doubt their value for predicting academic performance. They are useful, perhaps, to spot gross inadequacies in applicants, and provide personal contact with acceptable candidates which may be renewed at the time of registration."

In Laval University a special test has been developed by a number of the staff and is being used on an experimental basis. Dr. Badgley[1] at the University of Saskatchewan has made a study of the origins of medical students and their social backgrounds. He concludes that those who come from urban homes are less likely than their fellows from villages and farms to seek practices in rural areas. Dr. MacPherson[2] of Dalhousie made an interesting study of the origins of medical students in that school and their means of financial support. "Farming, mining, logging and fishing", which constitutes 28.5 per cent of the work force in the Atlantic Provinces, provided only 13.4 per cent of the medical student population, while "commercial and financial", which constitutes 5.8 per cent of the work force, provided 23.6 per cent of the medical student population. This and other interesting studies on the financing of medical students were discussed in a paper presented by

TABLE 3–6

APPLICATIONS FOR ENTRY TO CANADIAN MEDICAL SCHOOLS COMPARED WITH ENROLMENT IN FIRST YEAR, BY UNIVERSITY, 1961–62 and 1962–63

University	1961–62		1962–63	
	No. of applications	First-year enrolment	No. of applications	First-year enrolment
Dalhousie	213	66	321	71
Laval	207	128	196	133
Montreal	208	124	239	126
McGill	830	109	929	112
Ottawa	359	68	392	71
Queen's	76	60	102[1]	59
Toronto	173	152	194[1]	175
Western Ontario	105	60	132	60
Manitoba	210	63	247	70
Saskatchewan	109	39	147	40
Alberta	111	76	176	78
British Columbia	251	61	271	62
Total	2,852	1,006	3,346	1,057

[1] Excluded are applicants for admission to first-year medicine upon completion of second pre-medical year.

Source: Macleod, J.W., "Medical Student Enrolment in Canadian Universities", *Canadian Medical Association Journal*, 88:683–690, April 6, 1963.

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[1] Badgley, R.F., Heatherington, R.W., and Macleod, J.W., "Social Characteristics and Prediction of Academic Performance of Saskatchewan Medical Students," *The Canadian Medical Association Journal*, 86:624, 1962.

[2] MacPherson, L.B., and Yoell, B.J., "The Social Background and Finances of Medical Students at Dalhousie University", *The Canadian Medical Association Journal*, 88:701–704, 1963.

Dr. MacPherson at the annual meeting of the Association of Canadian Medical Colleges, 1962. At the same meeting, Dr. Anderson and Miss Riches[1] of the University of British Columbia presented the results of a study of certain information available on each applicant to the Faculty of Medicine since 1952. The study was later extended to include the examination of the Medical College Admission test, its correlation with previous academic records, and for the applicant who was admitted, the standing at examinations in the first professional year. These studies are being continued. These and other studies reflect the efforts that are being made to determine what factors influence the student's decision to enter medicine, and with what success admission committees are selecting the students who will complete the undergraduate course.

Table 3–6 shows that there are now more applicants for admission than there are spaces available; the excess varies in different schools. In McGill University there were many more applicants even in 1958, which was a "poor year", a reflection of the policy of that school accepting many more applicants from the U.S.A. than is the practice in other schools.

In Table 3–7, it will be noted that the wastage from all causes in the first professional year varies from 32 per cent to a low of 2 per cent, with the highest casualties in the year 1958–59. Even with the present careful selection, there will probably be a first year attrition, from all causes, of between 7 per cent and 10 per cent. A certain number may be salvaged by being allowed to repeat the year.

Table 3–8 shows that of 100 students selected for the first professional year, in the years 1951–55, somewhere between 85 and 90 finished the course. These are important figures in forecasting the number of medical students for which the country must make provision in order to qualify sufficient doctors for the future. Certainly, as is forcibly noted in Chapter 11, a reduction in wastage of 50 per cent reduce the number of needed new medical schools by one.

Can selection be made more accurate? Certainly, with larger numbers of candidates, the wastage from academic failure may be reduced, but on the other hand, some candidates who were regarded as borderline on admission have gone through the course with little in the way of distinction, but have given promise of being very useful and conscientious members of the profession. Hunter *et al.*[2] have stated, after a careful study of 50 per cent of the 1944 McGill class of medical graduates, that there is no statistically significant relation between academic performance as a student and professional achievement as a physician, fifteen years after graduation. There is as yet no completely accurate means of predicting whether a young man or woman at the age of 20–21 is going to complete the course and make a useful contribution to medicine.

[1] Anderson, D.O., and Riches, Eleanor, "A Decade of Experience with Medical School Applicants at the University of British Columbia", *The Canadian Medical Association Journal*, 88:693–700, 1963.

[2] Hunter, C.A., Lohrenz, J.G., and Schwartzman, A.E., "A Fifteen-Year Follow-up Study of Medical Graduates". *Canadian Medical Association Journal*, 87: 865, 1962.

TABLE 3–7

CANADIAN MEDICAL SCHOOL EXPERIENCE 1949/50–1961/62

Losses at first year level — Failure to fill class, withdrawal during term and academic failure[1]

University year	Official class size	Number actually registered	Vacancies at start of term: Columns 1 and 2 (+ indicates over-filled)	Vacancies at start of term: Dean's report	Attrition rate at first year exams: No.	Attrition rate at first year exams: %	Number of first year repeaters in 10 years 1951 – 1961
1. DALHOUSIE							
1949–50 ...	58	58	0	0	3/58	5.2*	20
1952–53 ...	58	59	+1	0	6/59	10.2	
1955–56 ...	58	56	2	0	3/56	5.4	
1958–59 ...	60	60	0	0	11/60	18.3	
1961–62 ...	67	67	0	0	10/67 (1960–1961)	14.9	
* Includes withdrawals during term, two in 1949–50 and one each in 1952–53 and 1958–59.							
2. LAVAL							
1949–50 ...	–	159	–	0		20*	18 (in 9 years)
1952–53 ...	–	119	–	0		–	
1955–56 ...	–	158	–	0		10	
1958–59 ...	125	124	1	0		6.4	
1961–62 ...	125	125	0	–		–	
* Does *not* include withdrawals during term.							
3. MONTREAL							
1949–50 ...	–	–	–	–	18/115	–	65
1952–53 ...	120	121	+1	0	18/119	16.5*	
1955–56 ...	120	129	+9	0	15/121	17.8	
1958–59 ...	120	142	+22	0	30/137	24.6	
1961–62 ...	120	125	+5	0	–	–	
* Per cent rate calculated to include withdrawals.							
4. McGILL							
1949–50 ...	–	122	–	0	12/122	9.8*	20
1952–53 ...	–	108	–	0	10/108	9.2	
1955–56 ...	–	115	–	0	18/115	15.6	
1958–59 ...	–	110	–	0	12/110	10.9	
1961–62 ...	116	109	7	0	–	–	
* Includes withdrawals.							
5. OTTAWA							
1949–50 ...	65	64	1	1	12	18.8*	29
1952–53 ...	65	63	2	2	15	23.8	
1955–56 ...	72	70	2	2	12	17.1	
1958–59 ...	72	68	4	4	22	32.4	
1961–62 ...	72	70	2	2	10	14.3	
* Includes withdrawals and repeaters.							

TABLE 3-7 (Concl.)

University year	Official class size	Number actually registered	Vacancies at start of term: Columns 1 and 2 (+ indicates over filled)	Vacancies at start of term: Dean's report	Attrition rate at first year exams: No.	Attrition rate at first year exams: %	Number of first year repeaters in 10 years 1951 – 1961
6. QUEENS							
1949–50..	–	56	–	0	1/62*		26
1952–53..	–	61	–	0	1/62		
1955–56..	–	54	–	0	0/63		
1958–59..	64	63	1	1	6/60		
1961–62..	64	60	4	0	4/51		
* These figures unrelated to Column 2.							
7. TORONTO							
1949–50..	–	162	–	0	8	4.9*	52
1952–53..	–	153	–	0	9	5.9	
1955–56..	–	155	–	0	13	8.4	
1958–59..	–	153	–	0	11	7.2	
1961–62..	150	150	0	0	8 (1960–1961)	5.5	
* Includes withdrawals and repeaters.							
8. WESTERN ONTARIO							
1949–50..	60	60	0	0	2/60	3.3	2
1952–53..	60	60	0	0	2/60	3.3	
1955–56..	60	57	3	3	6/57	10.5	
1958–59..	60	60	0	0	1/60	1.7	
1961–62..	60	60	0	0	–	–	
9. MANITOBA							
1949–50..	72	72	0	–	–	12.6	75
1952–53..	72	73	+1	–	–	12.9	
1955–56..	72	72	0	–	–	14.1	
1958–59..	72	51	22	–	–	21.6	
1961–62..	72	64	8	–	–	–	
10. SASKATCHEWAN							
1949–50..	32	32	0	0	3/32	9.6	13
1952–53..	32	32	0	0	2/32	6.2	
1955–56..	40	41	+1	0	5/41	12.2	
1958–59..	40	34	6	6	4/33	12.1	
1961–62..	40	39	1	0	–	–	
11. ALBERTA							
1949–50..	–	50	–	–	1/50*	2	9
1952–53..	–	60	–	–	3/60	5	
1955–56..	–	58	–	–	3/58	5.2	
1958–59..	60	51	9	9	3/51	5.9	
1961–62..	76	76	0	0	3/64 (1960–61)	5	
* Does not includes academic failures with permission to repeat the year. These were few – only one in four of the above years (no record for 1949–50)							
12. BRITISH COLUMBIA							
1949–50..	60	60	0	0	–	5	17
1952–53..	60	60	0	0	–	8	
1955–56..	60	59	1	1	–	16	
1958–59..	60	58	2	0	–	10	
1961–62..	60	61	+1	0	–	–	

[1] Academic failure may result in requirement to discontinue medical studies or to repeat the year. Attribution should include these two groups as well as withdrawal during term.

Source: Based on returns to the Questionnaire sent by the Royal Commission on Health Services to the Deans of Medicine, academic session 1961–1962.

TABLE 3–8

MEDICAL STUDENT FAILURE AND DROP-OUT DURING MEDICAL COURSE
EXPERIENCE OF CANADIAN MEDICAL SCHOOLS OVER FIVE-YEAR PERIOD

University	Proportion of students admitted to medicine who graduate eventually, by university and by year of admission.					Average loss, all reasons, over five-year period, by university and by year of medical course.				
	1951 %	1952 %	1953 %	1954 %	1955 %	I %	II %	III %	IV %	V %
Dalhousie ...	87	87.5	88	91	90	12 (37/308	4 11/277	0.8 2/258	0 0/263	0 0/255)
Laval	93.8	93.6	92.6	96.8	87.4	13	3.5	1.6	0	0
Montreal	71.3	75.6	78.7	81.8	82.9	7.9 (47/598	.6 3/525	1.0 5/529	.2 1/520	.2 1/532)
McGill	87	91	87	91	83	11	2	1.5	0.4	NA
Ottawa	80	60.1	76.6	61	78.6	16.7	11.1	0	0	NA
Queens	95	95	83	89	92.6	8.4	6.8	1.1	0.6	NA
Toronto	—	—	85	84	88	8	5	1	0.1	NA
Western Ont. ..	96.6 (57/59	95 57/60	91.6 55/60	98.3 59/60	85.9 49/57)	4	1	0	0	NA
Manitoba	93	97.3	86.9	85.5	94.5	7.9	1.4	2.8	0	NA
Saskatchewan	93.6 (29/31	93.7 20/32	96.6 32/33	98.5 39/40	83.5 34/41)	—	—	—	—	NA
Alberta	82	87	82	87	88	9	4	1	0.3	NA
British Columbia ..	93	96	88	86	86	8.0	1.6	0.7	0	NA

Source: Based on returns to the Questionnaire sent by the Royal Commission on Health Services to the Deans of Medicine, academic session 1961—1962.

CONCLUSIONS

1. That Faculties of Medicine in Canada, through their universities, be encouraged to explore with Departments of Education and the setting-up of special courses, and in some instances special secondary schools, where selected and capable students might be adequately prepared to enter the study of medicine with the saving of one or two years over the present prevailing practice.

2. In view of the limited number of places available in Canadian medical schools, and the wastage through failure, indecision and other factors particularly in the first professional year, it is recommended that the present methods of selection be carefully studied, and every effort made to explore new methods and techniques of student selection.

CHAPTER 4

THE CURRICULUM IN THE MEDICAL COURSE

> "What we should be seeking is to develop in men and women the skills of the clinician, the ethos of the healer and the instincts of the scientist."[1]

FIRST AND SECOND PROFESSIONAL YEARS

We have seen that the science requirements for admission to the study of medicine are fairly uniform in all the Canadian schools: a sound basis of physics, chemistry, zoology and, in most instances, an introductory course in psychology. There will be great variation in the amount of study the student has pursued in the social sciences, in the classics and in the humanities. Indeed, this variation is to be commended. As well as graduates in Arts and Science, students with degrees in Agriculture, Dentistry and Veterinary Science, in Physical Health and Education, may be admitted, provided always, of course, they have the necessary requirements in the science subjects already noted. Those students who have pursued honour courses, say in the Classics, in the Social Sciences, in English or in History, will, if they decide to enter Medicine, need to spend at least one extra year in the study of the basic sciences.

The patterns of curriculum arrangement in the professional courses do not vary greatly from school to school, or from province to province. Several of the schools are at present undertaking studies with regard to revision of their curricula. McGill University has recently completed such a study and has made some significant changes, notably a reduction in the number of hours devoted to the studies in anatomy, and in the number of lectures in the course in general, and the introduction of the clerkship system in the third medical year.

Final year examinations in all provinces, except in French schools in Quebec, are held conjointly with the Medical Council of Canada. In some provinces this examination is held at the end of the fourth professional year, in others it is held at the

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[1] Anderson, Donald G., Presidential address 1962 — "Some Pertinent and Impertinent Comments on Medical Education", *Journal of Medical Education, 38:1.1963.*

end of the pre-registration or intern year. For all the Quebec students who expect to practise in that province there is a conjoined examination with the provincial licensing body. All students registered in medical schools in the Province of Quebec may, if they so desire, avail themselves of the examination of the Medical Council of Canada, and thereby secure a place on the Medical Register of Canada.

There has been a great deal of discussion in the English-speaking world during the last 10 years on methods of medical education. It is generally agreed that, in spite of the tremendous changes that have occurred, in spite of the great increase in knowledge, the person who intends to study medicine must have a reasonably sound basis in those traditional subjects commonly known as anatomy, physiology and biochemistry, and that these should lead on to the study of microbiology, pharmacology and pathology. Major discussion has centered around the way in which these subjects should be presented, and the way in which they should be integrated with each other, particularly, the dual study of man as a biological organism, and as a human patient with the various manifestations of disease. On the one hand, there are experiments where an attempt is made to carry on studies in all these basic fields parallel with study of the living patient. On the other hand, it has been believed for several years that — although integration of these various sciences must be achieved if the student is ever to understand their application to clinical medicine — the ultimate result will be better obtained if he puts most of his time and effort on one subject, prove some degree of mastery of it by a suitable examination, and then proceed to one of the other subjects.

In the Canadian schools, in the first year anatomy, histology and varying amounts of genetics and perhaps some biophysics are taught parallel with biochemistry and with human physiology. In the second year the student proceeds to complete human physiology, to take courses in pharmacology, in microbiology, pathology and usually in neuro-anatomy. About the middle of the academic session he begins the practical study of the patient by a series of lectures, tutorials and bedside demonstrations and practice, which attempt to make him familiar with methods of interview, and particularly with the art of physical examination.

Examinations are held at the end of each academic session, and usually advancement to the following year is conditional on passing all the examinations of the previous year.

The biochemists state, almost without exception, that the students come to them with insufficient knowledge of organic and physical chemistry. Biochemistry is frequently taught by highly qualified non-medical scientists who teach biochemistry to many others besides the medical students. It may be somewhat difficult for the medical student in his first year in the professional course to relate this comparatively new information in a rapidly expanding branch of science to illness of the patient he has not yet seen.

The educational emphasis in the years devoted to the basic sciences is shifting from formal lectures and rigid exercises to situations in which the student is expected to demonstrate his initiative and to be selective in his interests. Lectures give place to seminars and group conferences. In the laboratory, after

the student has mastered the essential techniques, he may be presented with a problem to solve, rather than a series of classical exercises. He may be permitted to suggest what he would like to investigate, and be given facilities to carry it out. Freed of a heavy lecture schedule, he has time to study in the library or at the laboratory bench, or to take elective courses in fields in which his special interests lie. Students who are especially interested are given appointments as research assistants in the laboratories of their teachers during the summer vacation periods; some of these are persuaded to undertake an academic life as a result.

In a study of anatomy, the student has three devices at his disposal: a professor, a book and anatomical specimens. Based on the relative importance given to these instruments, there are two main methods of teaching – the French and the Anglo-Saxon. The French method emphasizes the professor; the Anglo-Saxon favours the anatomical specimen. The student should acquire a practical, rather than a theoretical, knowledge. To this end, for example, at Laval University lectures are reduced; dissection, the study of radiological and surface anatomy are emphasized. Exercises carried out on the living give the students a true concept of a three-dimensional anatomy. Periodic colloquies are held in which groups of students are seated with their monitor. The students do the talking, having prepared answers to specific questions. The colloquy trains the student to voice his knowledge and thus to recognize gaps in his education.

This all requires a considerable exercise of memory and is time-consuming, both in the work in the laboratory and in the amount of reading and memory work at home. The amount of time devoted to this subject, including histology, varies at different schools from 500 hours to something over 800 hours.

The teaching of human physiology usually begins midway through the first academic session, by a series of laboratory exercises and lectures on the various systems of the body. The methods of presentation vary a good deal from school to school. In the University of Manitoba, for example, the teaching has been carried forward actively into the second medical year as a course in applied medical science, with the student being encouraged to do some sort of project or exercise in measurement, for which he has conceived the plan himself. Likewise there are various plans to correlate scientific physiology with a study of the patient; this is somewhat easier than in the other basic sciences because, in the second professional year, the student is being introduced by clinicians to patients on the wards. The study of human physiology shades easily into pharmacology. Alterations in function as a result of the administration of various drugs and biological materials can be demonstrated in parallel with the student's studies on normal function. The Department of Pharmacology in the Medical School at the University of British Columbia has designed some valuable laboratory exercises planned to stimulate and encourage the student's ability for independent thought. Such exercises might be based on an attempt to verify the claims of drug manufacturers in the promotional literature supplied to doctors along with samples of the product.

During the courses in pathology and microbiology which usually extend throughout the second professional year, the student relates easily to a patient with disease. He can see the results of disease and observe in detail both its gross and microscopic appearances. He learns the entrancing story of micro-organisms, the part they have played in the history of mankind and of man's attempt to understand and to prevent disease. In most schools he will be introduced at this stage to public health, to an examination of the important place that social conditions and environment play in the maintenance or modification of the health of the individual.

There is obviously great scope for experimentation and new ideas in the teaching of pre-clinical sciences in Canadian medical schools. The Association of American Medical Colleges has devoted three of their annual institutes to discussion of these subjects. An English writer[1] has suggested that the subjects described as "basic sciences" of medicine are not really basic at all – that medicine existed long before the birth of any of these important sciences, that they were born as adjuncts to the study of medicine. Be that as it may, the Committee believes that the study of modern medicine must be firmly based on a knowledge of these sciences; that the doctor of tomorrow must be prepared to continue his interest in them, but that at the same time the glamour of the new science should in no way detract from the ultimate goal of the understanding of man as a human being in whom the interaction of environment, of heredity, and of all the human emotions can play so very important a part in the maintenance of health.

In the medical school we are dealing with students who have had at least two years' experience in scholarly effort in college or university – many are graduates in Arts, Science or in another professional course. Should they be regarded, then, as graduate students? Can a student who seeks a first degree in any discipline be so regarded? Certainly, in most Canadian schools this is not the case. Indeed, it was probably only as a result of conformity to American practice that schools in Canada instituted the M.D. as the first degree in medicine, rather than an M.B., as is still the practice in the United Kingdom and all the other countries of the Commonwealth.

In most schools in Canada the student time in the first two years is as carefully rationed and supervised as in a freshman year in a College of Arts and Science. In the upper years there is somewhat less obligation to attend scheduled assignments. At McGill, electives have been introduced in the third professional year, as well as a fortnight entirely free of planned assignments. In the opinion of most Canadian educators, 25 per cent of the students in our schools would benefit from elective studies, while the remainder will find the demands of the basic course sufficiently heavy to require their full time and effort and yet the academic quality of many of the students is the equal of many of the students who are enrolled in honour courses in the Faculties of Arts and Science, or even in the graduate school. The Curriculum Committee of the new School of Medicine in Lexington, Kentucky, has started as an educational policy, that "the School

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[1] Osmond, H., "Medicine, The Mother of Sciences", *Canadian Medical Association Journal*, 87: 808, 1962.

should provide an atmosphere of graduate education wherein its students can acquire a sound and adequate scientific basis for the practice and continuing study of medicine".

How can the schools accomplish the very necessary preparation of the medical student in anatomy, biochemistry and physiology, and at the same time ensure that it will be a challenging scholarly experience and a suitable introduction to his clinical studies? We think there is great opportunity for innovation in this area of the undergraduate curriculum. There are unlimited opportunities for a new approach through a study of the cell. It is at this level that many of the new advances in biochemistry, physiology, histology and microbiology are now proceeding, and indeed finding common ground for investigation. Horsfall,[1] speaking before a recent annual meeting of the Association of American Medical Colleges, gave a brilliant demonstration of the manner in which several scientific disciplines, previously regarded as separate and discreet, might come together in, for instance, the study of the virus of poliomyelitis. Could the medical student be introduced to the study of human biology in a comprehensive course based on modern knowledge of the cell, and involving the disciplines of histology, physiology, biochemistry, physics and microbiology?

We would suggest that some schools should undertake exploration of new groupings of studies in the basic and pre-clinical sciences, and the most effective means of presenting them to students, the majority of whom have the intellectual capacity and the background to do work at the graduate level.

In these two formative years, the student begins to study child development through a series of lectures which relates this important subject to his other areas of study, and he usually has an introduction to psychiatry with a review of his earlier studies in psychology. He is then ready to bridge the gap between these basic studies and clinical medicine, the study of the individual patient. In Sweden and French Canada, this bridging of the gap is called the propaedeutic year. Perhaps the most important facet of this process of "bridging" is the teaching of a method of eliciting the story of a patient's illness, and the art of conducting the physical examination. It can and should be the highlight of the undergraduate clinical course. The Department of Medicine usually takes the major responsibility for its organization and method, but other departments, notably surgery and paediatrics, have very important contributions to make to both organization and presentation.

At the University of Florida we were interested to note that the second-year student, after completing the work in the basic sciences of the second professional year and a short holiday, returns to the hospital and spends a period of approximately nine weeks, devoting his time entirely to the study of methods of taking a history and doing a physical examination. This period covers the months of May and June, and it was so placed because at this time the residents have almost completed their training and are therefore of greatest value in assisting the staff in that highly individualized type of instruction.

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[1] Horsfall, F.L., *Journal of Medical Education*, 1961, 36: 12,24—28.

THIRD AND FOURTH YEARS

The last two years of the professional course are, for the most part, given over to the study of the patient. Such studies are departmentalized under medicine, surgery, obstetrics and gynaecology, paediatrics, psychiatry, and other specialties. There is practical work in small groups on wards, systematic lectures, theatre demonstrations, combined conferences, laboratory work in chemical pathology, special lectures in public health, and, in the final year, efforts to introduce the students to the problems of social medicine, environmental medicine, lectures on ethics, lectures on the history of medicine, lectures on insurance. The Canadian medical student, in these two sessions of thirty-two weeks, is exposed to nearly all the facets of modern medicine, for the most part under the guidance of conscientious and well qualified teachers.

As in the first two years, all the subjects are carried along in parallel with an examination in all the subjects at the end of each year. In only one Canadian school, which has recently revised its curriculum after a very careful study, is there any real effort to adopt the "block system". There are still many hours of lectures, particularly in the third professional year. If one were to walk into a lecture room in the third year, he would hear an excellent outline of a particular aspect of medicine, and see the students urgently trying to commit to paper what the lecturer was saying, obviously for use at some future examination.

The students are supervised in the two final years, but a great deal of their teaching consists, even in the smaller groups, of the supervisor talking. It is interesting to note that Dr. George Miller of Chicago, who has made a careful study of different methods of medical education, has observed that in one school where student participation was an important objective, perhaps 80 per cent of the time devoted to communication was taken by the supervisor or teacher. We fail to realize that these young men and women are at least four years away from high school graduation, they have been carefully selected, and yet we are inclined to treat them more as high school students than mature university students. We do not require them to think enough for themselves. We do not give them enough responsibility. We probably teach too much, but we have failed to stop and ask ourselves – is the student learning, and how best can he learn? Should we not encourage these brighter than average young men and women to think independently?

Nearly every medical school we visited outside Canada relies very greatly on what is commonly called the "block system" of teaching in the clinical years. In this method not only is the student assigned to a service, but he becomes part of that unit with definite responsibilities. He devotes all his time, for a certain period, to studies in that particular area and to the activities of the unit. For instance, in the new school in Umeo in Sweden, we visited the Department of Ophthalmology and found in a busy out-patient department that two students were assigned to the clinic. Not only had they taken the histories, but they were doing retinoscopy and the routine assessment of vision under the

direction of one of the junior teachers. In England, the block system has been in vogue for many years. It is interesting to note that in both Edinburgh and Dundee curriculum builders are slowly veering to a similar system.

We think that the student, during his final year, is sufficiently mature to do much of the work that is now allocated to the so-called "rotating intern" in the teaching hospital. If the last two years of the medical course could be given over to continuous opportunities for learning, without the interruption of a long vacation, the student could be assigned to this duty as a clinical clerk, immediately on the completion of his third-year examinations. It is true that many of the licensing bodies in the provinces demand a rotating internship as a pre-registration year. Those who devised the idea of a rotating internship had in mind that the student would spend a reasonable time on medicine, surgery, obstetrics and gynaecology, and paediatrics, with, possibly, an opportunity to have some contact with anaesthesia, ophthalmology and otolaryngology. This was regarded as the best training for family practice.

The qualifications for family practice, however, have altered considerably in the last 25 years, and with the great improvements in communication and transportation, there is little justification for the family doctor to undertake the sort of work which should be referred to a specialist. The air ambulance service of Saskatchewan is an example of an organisation which makes the service of specialists immediately available to the most outlying and isolated parts of that very large area of Western Canada.

As we see it now, the best graduate training for family practice would be the responsible position as resident in the fields of medicine, paediatrics, psychiatry and maternity work. It would be reasonable for those few practitioners who work in the isolated areas, and who have to undertake some surgery, to seek a post as assistant resident in surgery rather than to depend on the two or three months of experience they may happen to get as a rotating intern in a large teaching hospital.

SOCIAL AND COMMUNITY MEDICINE

It is generally agreed that, even with all the advantages of modern specialism, both in the fields of diagnosis and of curative medicine, 50 per cent of those licensed to practise will be needed in the field of family, general, or what might be more aptly called "personal" practice. What should the medical schools be doing to focus the attention of the student on these facts of medical life? From the time that he completes his pre-clinical subjects and begins to study patients, the student is under the influence of highly skilled physician-teachers who usually have special knowledge in one field and confine their teaching for the most part to that particular area. If he is in a school where there are active out-patient clinics associated with the teaching hospitals, he will see something of the everyday problems that confront the doctor as he deals with ambulatory

practice in his office. Indeed, some of his supervisors in the out-patient clinics may be family doctors themselves. In only one school in Canada is there an active and successful plan to project the out-patient facilities into the homes of selected patients and to allow the student to participate in this home care programme. In other schools there is encouragement for a few students, in their final vacation, to work as assistants for short periods with selected family doctors. In some instances, the department of social and preventive medicine organizes home visits for the students, with particular emphasis on the influence of social conditions such as housing, unemployment and alcoholism on the general health of the community. Now that the conquest of the communicable diseases has been effected, departments of preventive and social medicine are beginning to stress the place of public health in programmes of rehabilitation and geriatric care, as well as in the facilities for general medical care available in a community. Some measure of the concern of medical educators for the interpretation to medical students of the rapidly changing patterns in this area is apparent in the numerous references in the literature to various attempts of medical schools and hospitals to give their students experience that would approximate that of the family doctor. It is obvious that the family doctor today must not only be familiar with all the modern methods of diagnosis and treatment, and with all the social agencies which are available to his patients, but he must also be ready to take full advantage of them. Frequently the solution of the health problem will be on the sociological and environmental side. The specialist who has been trained exclusively in his own particular field of organic medicine may be an excellent teacher in his field but may fail to stress the importance of sociology; nor does he see the minor diseases, the emotional disturbances, the everyday upsets of childhood that make up 85 per cent of the family doctor's work. There is, then, some solid ground for the criticism, offered by members of the College of General Practice, that we are preparing a group of students 50 per cent of whom will practise as family doctors, and we fail to give them a reasonable knowledge and experience of the modern problems of family practice. One of the greatest difficulties of those who are grappling with the problem is the uncertainty of the future patterns of practice. The image of the family doctor is already changing. He is much more likely to practise as a member of a group; in the future an increasing number of his patients will be covered by some plan of medical care insurance. In one province there is already universal medical care insurance. In all the provinces there are hospital insurance plans that are very nearly universal in their application. Public Health authorities are taking increasing responsibilities, not only in preventive programmes, but in general social areas such as rehabilitation and the care of the aging. How, then, can we prepare our medical students for family practice?

In Edinburgh, where the patterns of practice are a little more stable than in Canada, the university assumes the responsibility for the total care of some 4,000 members of the community who live in close proximity to the medical school. Full-time members of the staff of the school act in the dual capacity as family doctors and teachers of the undergraduates in this important field of social medicine and personal medical care.

In Birmingham, the university will establish institutes of geriatrics, of paediatrics, of psychiatry, of maternity and gynaecology, on land close to the medical school, and will arrange for the family doctors in a community of 100,000 people to take a special interest in one or other of these four special fields. When their patients are in need of admission to one of these special institutes, they will continue to care for them, with assistance, when necessary, from the consulting staff of the main teaching hospital. Presumably medical students will take an active part at the home, office and institute level.

In the United States many schools have preceptor plans. Family doctors, specially selected, take students into their practice for varying periods, introducing them to the everyday problems of the family practitioner, as an obligatory part of the final year's study of medicine. Good preceptor plans for short periods on a voluntary basis have been in use in the universities of Manitoba, Saskatchewan, British Columbia and Dalhousie for several years. In Saskatchewan there has been a two weeks' compulsory plan since 1957. A similar plan is being made compulsory in Dalhousie in the current year.

Because the successful practice of medicine at the family level is so definitely related to a knowledge of the modern approach to the social sciences, it would seem logical that there should be more stress on study in this field at the pre-medical or pre-clinical level. Just as anatomy, physiology and chemistry are necessary to the understanding of the organ systems, surely it would be reasonable to give the student equal advantages of study in the social sciences as a preliminary to what we believe is just as important, the understanding of the individual as a human being.

In a recent issue of a medical journal[1] there is a report of an organization meeting called to discuss and plan "a new medical course". The outline of the plan would include studies in psychology, social science and behaviourism, combined with the present subjects in the first two years of the British curriculum for the undergraduate medical student. This would lead to a degree of B.Sc. and allow the student to advance either to further study in social work, in clinical psychology, in nursing or, if he so desires, to complete a medical degree in a further three years. There are courses in several universities which combine an intensive study of the biological studies with medicine, allowing the candidate to earn an honours degree in science, and a degree in medicine in seven years after his entrance to university. Perhaps we should encourage a somewhat similar course with stress in the social sciences in the early years.

What then is the answer to this problem of how best to lay sound foundations for the undergraduate who plans to enter – or will be attracted later to enter – family practice? In an economy, and under conditions of practice such as now prevail in Scotland, we are convinced that the plan adopted at the University of Edinburgh gives the student an experience in family practice which he could obtain in no other way. He sees practice and engages in all its facets under exemplary conditions, with the limits of the over-all plan of medical care which the nation favours. He becomes aware of the very wide range of knowledge with which

[1] "A New Kind of Medical School," *Lancet*, Aug. 11, 1962, p. 307.

the family doctor must be familiar, and of the varied social agencies without which much of the doctor's efforts would be fruitless and sterile. He learns, also, that the doctor must quietly recognize the limitations of his own facilities, and that there is always consultant help quickly and easily available.

Here in Canada, if the patterns of practice were as well established as in the United Kingdom, we might well advise a somewhat similar experiment for some medical schools. It might, even now, be a profitable experiment in a school situated in one of the larger metropolitan centres, provided that the hospital, the local profession, and the College of General Practice would co-operate in the project.

For the majority of the schools, a more immediate need would be the establishment in the teaching hospitals of departments of family practice which would have their academic interests in departments of community medicine, embracing the responsibilities for preventive medicine and social medicine. Such medical school departments would, of course, work closely with departments of obstetrics, psychiatry and paediatrics, as well as the department of medicine.

It is suggested that, in a general hospital, for example, there be beds allotted to the department of family practice, physically adjacent to the beds in the general medicine teaching unit, that the resident or assistant resident in medicine have the beds in family practice under his care, that the staff doctors responsible for care of the patients be specially selected family practitioners of the area, and that student clerkship experience be included in this block of family practice beds. The professor of medicine or a senior physician of that department would have consultant responsibilities to the family practice unit, and joint rounds with the staff in family practice would be arranged at regular intervals. Students could arrange to spend part of their day during a specified period with one of the doctors at his office and in making home calls. An arrangement such as outlined would do much to widen the student's experience in this important field, and would at the same time raise the standards of family practice in the area served by the school.

It is obvious that there is a great ferment going on concerned with how students should be prepared to begin the study of medicine; what should be the content of courses which are at the undergraduate level; what old methods should be discarded, and what demands are to be made on the student in the light of the ever-changing picture of medical knowledge. It has been stated that the aim of the undergraduate course is to develop the basic or undifferentiated doctor. No longer is it expected that he is qualified to practise at the end of his course. The school should aim to encourage scholarship and some capacity for investigation and inquiry in all its students, with the hope that a reasonable number will return, after their clinical experience, to careers of investigation and teaching. It should encourage in all its students the capacity for independent thought and the critical analysis of material presented, and the ability to reach conclusions after careful summation of evidence. The information derived from taking the history of the patient (and this implies some knowledge of human nature), and from a careful physical examination can never be replaced by the most complex laboratory investigations, important as they may be. It is obvious that only the principles of therapy can be learned during an undergraduate course.

QUALIFICATIONS FOR PRACTICE

The responsibility for determining whether an individual is sufficiently qualified to practise medicine, rests in each case with the government of the province. This right is usually delegated to a provincial licensing body. Except in the case of Quebec, the right of examination was gradually handed over to the Medical Council of Canada. In Quebec the College of Physicians and Surgeons still maintains its right to examine all students who propose to register for practice in that province. This they do in a joint arrangement with the medical schools of the province. The Medical Council of Canada has a strong representation from the medical schools of Canada, as well as from the various licensing bodies, and the conjoint examination in which so many of the schools participate, is arranged by a National Examining Board made up largely of senior teachers from the medical schools.

It has already been noted that the passing of an examination does not confer on the successful student the right to practise. The licence to practise in a province rests solely with the licensing body of that province. Each determines in what hospitals the student may take his pre-registration year; it deals with the registration of doctors from other provinces and other countries, and other important aspects of professional standards. In those schools where the final examination is deferred until the end of the fifth or intern year, the schools themselves choose the hospitals in which this pre-registration year may be taken. Continued approval depends on the administrators of schools having the privilege of visiting the hospitals from time to time and satisfying themselves that the experience of their students is a satisfactory one.

Periodically suggestions are made that the passing of the final year examinations in Canadian medical schools and the conferring of a degree in medicine should in itself be sufficient evidence on which the Medical Council of Canada could give the student registration. An arrangement such as this exists in the United Kingdom. A graduate of any medical school in that country can, on the payment of the requisite fee, register with the General Medical Council and receive a licence, provided that he can present, as well as his Certificate of Graduation, another certificate, stating that he has completed at least one year as house surgeon and/ or house physician in a hospital approved by the Council. The question of automatic registration for graduates of Canadian schools has been debated on more than one occasion during the last 15 years in the Medical Council of Canada, but the proposal has been defeated. There is a feeling, particularly in the newer schools of the country, that it adds strength to their position if the graduates of their schools try the Medical Council examination, which is on a national level, although much the same benefits might be gained if the medical schools adopted the practice of having external examiners in the final examination, as in the United Kingdom. It seems unlikely that any change in the existing system, with which the schools have become familiar over the last 15 years, is likely to find favour in the immediate future.

EXAMINATIONS

This discussion of the conjoined examination offers an opportunity to say something about the whole philosophy of examinations as they are now used in Canadian schools. We derive our traditions largely from education in Scotland and in France. The examinations at the end of a course have been a very important feature for many years of the Scottish system. In several instances in Canada efforts have been made to cut down the number of examinations. Here, as in Edinburgh, they are held at the end of each academic year. They are attended by a good deal of formality. The whole question of advancement depends on them to a very large degree, and the achievement of good competitive standing undoubtedly carries with it, in many instances, prestige and often preferment.

The examinations, like the teaching, are departmentalized. The examinations in physiology are given by physiologists. The examinations in surgery are devised and given by surgeons. In no instance did we find any real effort at comprehensive examinations. It is true that term tests are given as a means of teaching and helping the student understand his subject, but final examinations as a whole are used entirely as a means of determining the knowledge of the student and his fitness for advancement. It is very common to see the Canadian student before an examination, even in the clinical subjects, spend long days and nights reviewing notes, reading old examination papers, and preparing what he believes would be good answers to such questions; in other words, overburdening his memory with facts which he hopes he will be able to set down in answer to the questions on his final examination. Time and again department heads say that if there is no examination advertised at the end of an academic session, the student will not devote as much time to the subject as he might otherwise. In other words, non-examination subjects get short shrift in the student's allotment of time.

Examinations in the United Kingdom and on the Continent play an even more important part than they do in Canada. We were impressed on a visit to the Faculty of Medicine in the University of Birmingham to find that the students in medicine for their final M.B. examination had to satisfy the following requirements: (1) pass a written examination, (2) satisfy the examiners in what is known as a) a long case, b) a short case, and (3) possess a knowledge of chemical pathology, and other tests. Their examiners might be any two or four distinguished physicians from the local Department of Medicine, and four professors of medicine from the medical schools of Edinburgh, Dundee, Leeds and Manchester. It was evident that the students approached this rather formidable ordeal with much more poise and apparent confidence than would be the case with the majority of our Canadian students.

We were also interested, while in Birmingham, to hear Dr. Thompson, the Assistant Dean, say that he thought there were many means of assessing the standards of knowledge of students other than those which are used at the present time. It is well known, of course, that in some American schools there are no final examinations. The student's progress is judged by those who are working

closely with him during the academic year, and if tests are held they are merely part of the tutorial process. The paper written by the student is used by the teacher subsequently to help the student see where he made mistakes. The Dean of the Medical Faculty of Yale University, speaking of the methods of teaching and promotion in his school, has said: "If one thing has been learned from this experiment over 30 years, it is that teachers and their attitudes are more important than curriculum structure and methods. There is much discussion about 'integration', 'comprehensive medicine' and 'vertical' versus 'horizontal' curricula. Unless the student is given an opportunity to think for himself, is given time for pursuit of special interests, and, most important, is freed from frequent course examinations and constant attendance at didactic lectures and recitations, efforts at integration – vertical, horizontal or diagonal – are wasted."[1]

In certain American schools an effort is being made to produce a comprehensive examination which might cover all the subjects that are taken in the first professional year. In Canadian schools, in the limited amount of time available in the calendar year – approximately 32 weeks out of 52 – much of the student's time is applied to preparation for examinations rather than preparation for independent thought. The students have come to depend on examinations. They would probably be the first to complain if they were abolished or greatly reduced. Indeed the numbers of those who have emotional breakdowns as a result of examinations might even be increased under a system where there were no examinations. The student would feel a great lack of security in not knowing where he stood in what he regarded as the long and difficult ascent to the achievement of a medical degree. Although here and there we have noted some attempts in Canada to reduce the number of final examinations, there is still much in this field about which doctors in medical schools should be deeply concerned. Surely some method can be devised which might tell us more accurately about a student's progress; a method less likely to produce emotional crises; a method less dependent on tremendous feats of memory, and more relative to the day-to-day ability for quiet, unhurried and critical thinking based on a background of scientific investigation and familiarity with the literature. A great deal of experimentation has already been done in American schools and in the American Board examinations, but Canadians in general do not favour the "multiple choice" system. There is an opportunity to explore further the comprehensive examination particularly in the pre-clinical years.

THE FINANCIAL SUPPORT OF MEDICAL STUDENTS

Before discussing further any changes of curriculum in Canadian schools it might be well to discuss the financial problems of students, because they have a very important bearing on what might be recommended in the way of a changed programme.

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[1] Lippard, Vernon, "The Yale Plan of Medical Education After Thirty Years". *Journal of Medical Education*, 29: 9, 1954.

In Canada higher education tuition fees have always been a fairly important source of income to the universities. This is only one of the many features which mark distinctly the line between higher education and secondary education in this country. The state has always believed that education in secondary schools should be free, but, traditionally, institutions of higher learning have had to find support for the establishment of their buildings from sources other than government, and also to seek support from private sources to supplement the assistance from government for the maintenance of the teaching programme. Medical student fees have traditionally been higher than those of any other faculty in the universities. They vary at the present time in Canada from $550 each year to something over $700. If the student comes from beyond the borders of the city or town in which the medical school is situated, he will need approximately $2,000 each year to cover his fees, his board, his room, his books, and other incidental expenses. If, while studying, he can live with parents or close relations, the total annual amount will probably be reduced by some $600 or $700. Traditionally the teaching terms at universities have been arranged so the student would have a relatively long period free of academic work during the summer, in the hope that he would be able to find work of a gainful sort, and earn some money towards the expenses of the academic term. During the periods of full employment students have been fairly successful in bringing back in the autumn amounts of from $500 to $700 from their summer earnings. The possibility of getting gainful occupation has varied with the economic conditions of the country, and medical students are not nearly as liable to get employment in semi-skilled occupations as are engineering students. In the early years of their course, if they seek occupations associated with the medical sciences, they are unlikely to get remuneration higher than that of a laboratory technician. The student, then, who seeks a career in medicine must count the cost. He must be prepared to finance at least two years in an arts college where the fees, although not as high as they are in medicine, are probably $450 per year. To this must be added the usual living expenses. Following this comes four years in medicine, where the fees, on the average, are $675. He is then ready to write the examinations for his M.D. Towards this total expenditure, if he works each vacation at some sort of gainful occupation, he might be able to save two-thirds of the total amount of his fees. For his personal maintenance, clothing, incidental expenses, books, during these six years, he must look to his parents, relatives, bursary funds, scholarship funds and loan funds provided through the university, government, or other agency.

In our examination of the Canadian medical schools we found that it was the exception for any medical student who had passed the examinations of the first or second year to find it necessary to discontinue his course because of insufficient funds. However, the pattern of student support within the school is a complex one. Nearly all the provinces have some sort of bursary support scheme which makes available, to students of reasonable standing, amounts varying from $250 to $500, depending on whether the student lives in the city or out of town. There is a great variety of loan funds, some supported by the provincial government, others by such foundations as the Kellogg Foundation, others by alumni. Nearly all loans are granted without interest until after the student graduates,

and then are likely to be subject to a relatively low rate. The awarding of financial support from these various sources constitutes quite a heavy responsibility in a large school. There must be some attempt at examining the student's financial background and that of his parents, unusual obligations which may result from early marriage and the support of children and interference with his normal earning powers during the summer because of various circumstances. These considerations and responsibilities, if taken seriously, can take up a good deal of time of someone on the teaching or administrative staff.

Another important consideration is the question of whether well-qualified students are not discouraged from going further than the completion of their secondary education programme when they or their parents are acquainted with the financial obligation entailed on entering a Canadian university. Dr. Jackson of the Research Department of the Ontario College of Education made an analysis of the numbers of Grade 13 students who passed all their examinations in the Province of Ontario, four years ago. It was interesting to note that some 40 per cent of the students with creditable standing, indeed higher standing than would be demanded by the universities, did not make any effort to register in an institution of higher learning in the Province of Ontario. Forty years ago in Ontario more than 50 per cent of the medical students came from smaller towns, villages and farm areas, and the children of artisans were well represented. At the present time a higher percentage come from the larger towns and cities.

Here we would refer, for comparison, to the Canadian student who has come through the Faculty of Arts and Science, who has, perhaps, achieved an honours degree in chemistry or physics, and who has decided to undertake graduate study for the M.A. or Ph.D. A very large proportion of such students would be supported by fellowships from the National Research Council or various other sources.[1] The fees in the graduate school are relatively low compared to fees in the medical school. The medical student, who entered university at the same age, has already spent four years in the university and has demonstrated that he is a student of considerable intellectual capacity, and must face two more years of, approximately, $2,000 expense each year, before he receives his first degree in medicine. We believe that it is just such circumstances as these that have very often diverted good students from the study of medicine.

It is perfectly obvious that university hospitals or university affiliated hospitals, and the teaching units organized in them, are just as much the laboratory for the clinical student as is the research laboratory for the graduate science student. Only if by some means whereby the medical student is freed of responsibility and worry relating to finance will he be able to give his best thought and effort to this very important part of his medical school programme.

Other agencies will be giving consideration to the best means of encouraging the well-qualified graduates of secondary schools to enter university, and to support them when they have been enrolled in various programmes. Such means,

[1] The Premier of Ontario has recently announced a new programme of financial support for students who register in the graduate schools of Ontario universities in M.A. and Ph. D. courses with the intention of preparing themselves for university teaching in Ontario. Although the details are not yet available, it is reported that each student will receive a bursary of $1,500.

whatever they are, should be extended, of course, to the student in his first two years of medicine. We can no longer afford to take the attitude that higher education is available only to those who are fortunate enough to have private means or who are brave enough to borrow sufficient money. Arrangements should somehow be made to seek out from the secondary school those who are well-qualified, and guarantee that they will have support as long as they demonstrate a high degree of intellectual capacity. Canada remains, along with the United States, a country in which higher education is extremely expensive compared to the United Kingdom, and indeed to all the countries in Europe. We are going to need more doctors. We are going to need more medical scientists, many of whom will not be able to look forward to large incomes at any time in their lives. We believe that the country would be making a good investment if well-qualified young men and women could be sufficiently assured of financial support so that they might enter the very important field of the medical sciences.

In the United Kingdom, in examining the registration in five different medical schools, it was estimated that from 80 to 85 per cent of all the medical students were receiving full maintenance scholarships, which included fees, books, residence accommodation and board. In Sweden the student who successfully gains entrance to a medical school pays no fees, and although there are a few full maintenance bursaries or scholarships, in most universities there is subsidized residence accommodation, and the student can borrow from a central loan fund, provided he shows the need to do so. In the United States the system is much as we have it here in Canada. In the state-supported schools the fees are perhaps $600 to $700 annually, whereas in private schools the fees may go up as high as $1,500, but there are a variety of scholarships, bursaries, and loan funds so that, again, once a student is registered in a medical school, it is unlikely that he will have to discontinue his course because of lack of finance.

NOTE: Since this chapter was written, the book "The General Practitioner" by Kenneth F. Clute, has been published by the University of Toronto Press, 1963. Dr. Clute has some cogent comments on the undergraduate curriculum which he makes in the light of an intensive study of the opinions of some 88 doctors practising in Ontario and Nova Scotia. In the main, they were very critical of the laboratory teaching methods of physiology and pharmacology and the lack of more practical work in the clinical years. They were almost unanimous in their opinions about the need for more opportunity to learn dermatology and psychiatry. We quote from Dr. Clute's book (p. 379) but we would note that some of his suggestions relating to a reduction in lectures and more stress on the tutorial method are scarcely in line with the practitioners' assessment of the value of different teaching methods.

> "We would suggest that a re-examination of the medical course might well include, not only the curriculum, but also the teaching methods. In the preceding paragraph, we pointed out that, though the learning of certain subjects is undoubtedly expedited by laboratory work, the *amount* of the laboratory work might be reconsidered. There are other subjects, however, in which the *effectiveness* of laboratory work as a teaching method might be questioned. In this regard, we have already quoted Hoff and his associates on the physiology laboratory and Morrill on the use of 'table-top demonstration' as contrasted with 'the method of long laboratory work'. We would ask whether all the laboratory exercises in such subjects as biochemistry, pathological chemistry, and bacteriology are effective enough as aids to learning to justify the expenditure of the time that is allotted to them.
>
> "We have discussed lectures and tutorials in some detail. It is unnecessary to repeat except to say, in summary, that we recommend that the student be made to accept a greater amount of responsibility for his own education. To this end, we have suggested that lectures be reduced in number and be used, not to cover the entire course, but for certain specific purposes; that greater emphasis be put on a student's reading and that adequate time be made available for this; and that greater use be made of tutorials, in which the difficulties encountered by a student in his reading and in his practical clinical work could be resolved and in which the instructors would keep track of the progress being made by the student."

CONCLUSIONS

1. Medical schools should begin to enquire more closely into the recommended pre-professional education of candidates who expect to enter medical school and to recommend such courses as are available and relevant in the social sciences. The possibility of establishing, in faculties of arts and science, special combined honour courses in the social sciences and the natural sciences should be explored.

2. In relation to curriculum planning and content, we are in favour of the greatest degree of flexibility, and we hope that nothing in the regulations of either the provincial licensing bodies or the Medical Council of Canada will interfere in any way with the efforts of schools to revise their teaching in line with modern tendencies.

   We would strongly encourage all the schools to devise some method by which the curriculum itself and its methods of teaching may be constantly under revision. This might be effected in different ways, whether through special committees stemming from the Dean's office, *ad hoc* study groups, or the allocation of young teachers to engage for a limited period in a special study of curriculum and teaching methods.

3. We are strongly in favour of the "block system" of arrangement of the curriculum, particularly in the third and fourth years of the professional course.[1] We would welcome changes in the teaching of the pre-clinical sciences with some grouping of related subjects.

4. We have noted with interest and approval the trend to reduce the number of lectures in the medical course. We believe, however, that the time devoted to purely didactic lectures can be still further reduced, and this time given to theatre clinics, joint conferences and tutorials, where student participation is made the main feature of the meeting.

5. We are in favour of reorganization of the curriculum and examination practices to allow for continuous study and experience during the last 22 months of the course. Such a change will necessitate adequate financial assistance, as noted below.

6. During the last two years of the professional course there should be available to each Canadian student an outright grant of $2,000 per year. Such financial support should be maintained until graduation dependent on continued satisfactory progress.

7. There is need for study of the best approach to community health requirements and the means by which these requirements are to be met. There is need for study of the nature of present-day practice. There is need to evaluate our teaching in relation to practise as it evolves in fact of rapid change, and there is need to introduce students to the practice of medicine in the commu-

[1] In the opinion of one of the members "block" teaching in the third year would be successful only if the recommendations for an 11—month year are implemented.

nity. We would welcome an experiment whereby, through an active out-patient department of a teaching hospital, arrangements could be made for the total care of a segment of the community limited in numbers to the requirements of teaching and research. This would imply active co-operation with the local branch of the College of General Practice as well as with the whole organized profession. Such a plan would require special financial arrangements and close relation to the Department of Social and Community Medicine of the school.

8. As an alternative to the conclusion in 7. above, we would favour the establishment in teaching hospitals of Departments of General Practice, the staff members of such departments to be specially selected, well-qualified family practitioners in the immediate community. Such departments might include in-patient services in medicine, psychiatry, obstetrics and paediatrics. Staff positions would be held on the same joint basis as in other departments, but the university rank might be established in the Department of Social and Community Medicine.

9. That present practices in the examination system of the Canadian medical schools be reviewed, with the possibility of providing means of assessing progress and fitness for promotion, other than by year-end formal examinations.

CHAPTER 5

THE MEDICAL SCHOOL

As noted elsewhere, one of the far-reaching effects of the Flexner Report, both in Canada and the United States, was to seal the fate of the independent medical school. All the schools in Canada which were in existence at the time of the Report, and all those which have been established since that time, are integral faculties or schools of a university. The head of the faculty or school has usually been a dean who has acted as the chairman of the faculty and as a policy-maker. Until 15 years ago he served on a part-time basis for a limited term, and was usually the head of, or an active member of, one of the teaching departments of the faculty. The general administration of the faculty, particularly that which pertained to finance, was carried on through the central offices of the university. These general arrangements still maintain, but an increasing number of schools have appointed full-time deans, in some instances with a limited period of tenure and in others until retirement or resignation.

We believe that senior members of faculties of medicine can and should take an active part in the academic affairs of the university. This may be effected through participation in the business of the senate, of the faculty council and its committees, and by day-to-day association with members of the other faculties.

We strongly support the principle that medical schools should continue to be active and integral units of universities, and that new schools should be planned only in those universities which are aware of the responsibilities involved, and willing to give full support to the plans.

The Dean is appointed, as of course are all officers and teachers in the Faculty of Medicine, by the Board of Governors of the university on the advice of the President or Rector. Senior teachers and department heads are usually selected by *ad hoc* selection committees, of which the Dean is the chairman. The selection must be approved by the President or Rector, and ultimately by the Board of Governors. The practice of selecting teachers of lower rank than department heads varies in different schools, but it is usually a matter for the department head in discussion with the members of his own department, and ultimately with the Dean.

The finances of the school are allocated directly from the central funds of the university, supplemented by the various research funds which have increased tremendously in the last 15 years. Universities derive their operating funds from four main sources: from fees paid by students of all faculties, from gifts and endowments, from federal funds, and from provincial funds. The faculties of medicine, in all instances except one, are allocated their share annually out of the sum of these consolidated university revenues. In Dalhousie Medical School there has been for the last several years a grant from each of the four Atlantic Provinces, earmarked for the operation of the medical school. This is a pitifully small grant, but it does help in the difficult financial position of the university in dealing with the needs of all of its faculties, for it receives minimal support from the provincial Government of Nova Scotia.

There has been a tremendous increase in the volume of medical research, particularly since the end of World War II, and to a large degree this activity in Canada has been centred in the medical schools. Medical research, as will be noted in other parts of the report, has been supported by voluntary societies, by private foundations and by the universities, but an increasing amount of money has been available from the Canadian Government through the Medical Research Council, the Defence Research Board, the Department of Veterans Affairs, and the Department of National Health and Welfare. The submission of applications for these grants, initiated as a rule in a department of the medical faculty, the dovetailing of grant funds into the annual departmental funds allocated from the university, the administration of the monies thus granted from the various national bodies – these factors have all increased the responsibility of the administrative officers of the faculty, and of the financial officers of the university itself. It will be noted elsewhere in this Report that the sum of the annual grants received by a medical school from these various research granting bodies may well equal or exceed its total teaching budget.

THE FACULTY

There is a long and honourable tradition in medicine that doctors, when they have the opportunity, shall devote a certain part of their time to teaching. Where it not for the maintenance of this tradition there would never have been any medical schools in Canada. Gradually the practice has been established that teachers in the basic sciences shall, in nearly all instances, be employed on a full-time basis, with their remuneration according to the general scale laid down by the university. The first full-time head of a clinical department in Canada was appointed in 1919. Gradually the practice of appointing what are termed geographic full-time heads of clinical departments[1] has spread to all the schools in depart-

[1] In Canada a geographic full-time clinical teacher is one whose first responsibility relates to his appointment in the university from which he should derive the major part of his income. He may see private patients, but he does so within the teaching hospital in which he holds a clinical appointment. There may be financial limits on the amount of income from private patients with which he may supplement his university stipend, and there may be limitations on time as well. He is encouraged to confine his practice to referred patients. He may not establish any office for private practice outside the hospital or medical school.

ments such as medicine, surgery, obstetrics and gynaecology, psychiatry and paediatrics.

Aside from the qualification "geographic full-time", medical schools use the same rank structure and terminology as that which is current in the parent university, with certain variations in the lower ranks of the clinical areas, such as clinical teacher, clinical assistant, or clinical instructor.

The salary scale in a basic science department follows the scale for the particular university. There were, at the time of this survey, 19 budgeted vacancies in basic science departments on the staffs of the 12 Canadian medical schools. The total number of full-time basic science teachers was 352. The range of salaries for full-time department heads varied from a low of $11,000 to a high of $18,000; for professors – $10,500 to $17,000; for associate professors – $8,500 to $12,300; and for assistant professors – $6,500 to $10,000. In the geographic full-time category there is considerable variation in the amounts of remuneration paid from the university for heads of departments ($10,000 to $22,000) and there are many variations in the arrangements for the head in relation to private practice. A comparison with salaries paid in American schools and those in Canadian schools is noted on Figure 5-1.

There has been a considerable improvement in the salary ranges of university teachers in the past five years, as well as much better pension arrangements. As noted in the section on the training of basic science teachers, for those with

TABLE 5–1

GROWTH OF FULL-TIME CLINICAL FACULTY IN TWELVE CANADIAN MEDICAL SCHOOLS IN EIGHT YEARS.[1] COMPARISON OF NUMBERS OF STRICT FULL-TIME, GEOGRAPHIC FULL-TIME AND PART-TIME (INCLUDING VOLUNTARY) TEACHERS IN CLINICAL DEPARTMENTS; 1953–54, 1958–59 AND 1961–62

Type of clinical appointment	Number of teachers by years		
	1953–54	1958–59	1961–62[2]
Strict full-time	25	76	71[3]
Geographic full-time	32	135	316
Part-time (including voluntary)	1,118	1,157[4]	2,758

[1] Clinical departments were established at the University of Saskatchewan in 1954–55. Its clinical staff in 1961–62 included four strict and 39 geographic full-time teachers.

[2] Figures in the 1961–1962 column are for "posts", not persons. In the official count there were 362 full-time teachers in 387 posts. A discrepancy in totals is due to a difference in returns made in two separate questionnaires to the American Medical Association and to the Royal Commission on Health Services.

[3] This includes 54 posts reported from McGill University.

[4] Because a larger figure is anticipated here one wonders if questionnaire returns were complete.

Source: Data for 1953–54 and 1958–59 are derived from "Annual Report on Medical Education", *Journal of American Medical Association*, 171: 1507, Nov. 14, 1959, Table 18. Data for 1961–62 are from questionnaire returns to Royal Commission on Health Services, Canada, 1962.

medical degrees, the investment of time and money is still an unattractive prospect when the candidate considers the starting salary for teachers in Canadian schools. He can probably command a 30 per cent higher salary if he chooses to apply to a good school in the U.S.A. Salaries have also been raised in the United Kingdom and there are many fewer qualified applicants from that country applying for vacancies in Canada than was the case five years ago.

The schools have benefited greatly in the last few years by the establishment of the medical research associateships by the Medical Research Council and by other full-time clinical posts supported by voluntary agencies such as the Heart Foundations and the Canadian Arthritis and Rheumatism Society. The Markle Foundation Scholarships of the U.S.A. have also done much to encourage the medical schools to enlarge their full-time clinical staffs.

TABLE 5–2

FULL-TIME MEDICAL FACULTY IN CANADIAN UNIVERSITIES. DISTRIBUTION OF FULL-TIME POSTS AND VACANCIES ACCORDING TO SIZE OF STUDENT CLASS AND ACADEMIC DIVISIONS, 1961–62

Medical schools grouped by size of first-year class[1]	Number of full-time posts[2]		
	Basic sciences	Clinical	Total
Group A Schools (8)			
Size of first-year class			
Average 60.4			
Range 39–76			
Total number of posts	273	225	498
Average	34.1	28.1	62.2
Range	26–47	14–53	41–87
Vacancies	16	16	32
Group B Schools (4)			
Size of first-year class			
Average 128			
Range. . . .109–152			
Total number of posts	166	162	328
Average	41.5	40.5	82
Range	26–60	8–83	39–130
Vacancies	9	9	18
Totals for 12 schools			
Number of posts	439	387	826
Vacancies	25	25	50
Number of teachers	414	362	776

[1] Registration of 1,086 first-year students in 1963–64 gives Group A schools an average intake of 67.5 (range 48-92) and Group B, 136 (range 119–162).

[2] "Full-time" is taken here to include both "strict" and "geographic full-time".

Source: Questionnaire returns by medical schools to the Royal Commission on Health Services, Canada, 1962.

There remains the problem of support for many more full-time investigators and teachers – not only to staff the existing schools but to form a pool of keen young scientist-teachers, who will be ready to assume major responsibilities in the new schools, which should be graduating doctors between 1970 and 1980. Indeed, all the schools would welcome, and could use effectively, young, well-trained clinical scientists who would work on a geographic full-time basis for a period of five years, and who then might be ready either to assume more senior positions, continuing on a geographic full-time basis, or to undertake part-time teaching with gradually increasing consulting work. Fifty such positions might be established in Canadian schools if there were available the necessary financial support for salaries, which should be in the range of $11,000 to $15,000 *per annum.*

There will be a continuing need for a certain number of clinicians who have the capability, the time and the desire to teach on a part-time basis. We see these coming in part from those who have had an opportunity to serve on a full-time basis for a limited period and have since preferred to undertake private consulting practice; others will be those who, adequately trained but with little bent for investigation, like to teach and will do so at some sacrifice of time and practice. We believe the present ratio of 303 geographic full-time teachers in the clinical fields to 2,585 part-time teachers who receive honoraria of from $50 to $1,000 *per annum* should be very markedly modified. The medical schools should have the means to employ more geographic full-time clinical teachers and investigators.

"THE DEPARTMENT" IN THE ORGANIZATION OF THE SCHOOL

In Canadian medical schools the department idea is a familiar and accepted principle of administration. It has the advantage of delineating responsibility for teaching and research in a given area. In the large departments, as well as being responsible for the best means of using the university money allocated to him, the head must seek research grants from many sources. In the thrifty integration of men supported by such grants into the complex fabric of teaching and research, a considerable load of administrative ingenuity is inevitable. Some heads do this job well; others leave much of it to efficient departmental secretaries; others have found that it is an economy to employ a secretary-accountant who has responsibility for the submission of applications for research and who keeps a constant check on the expenditures from each of the sources from which the department may draw its support.

Basic science departments may teach in several areas of the university other than medicine, and in programmes other than those leading to a degree. For instance, in one of the larger schools, the department of anatomy was responsible, during one academic session, for the instruction of 794 students, of which undergraduates in medicine accounted for fewer than 150. The department gave instruction in special night-classes throughout the session to another 50 students enrolled in post-graduate courses in the medical faculty. Likewise during one academic

session, the department of biochemistry gave instruction to 404 students, of whom 140 were registered in medicine, and the department of physiology to 968 students in lectures and 634 in laboratory exercises, of whom 140 were in medicine.

The number of "departments" has slowly but steadily increased. At one time pathology might have included bacteriology, pathological chemistry and haematology. On the clinical side it is not unusual in American schools to have departments of neurosurgery, orthopaedic surgery, plastic surgery, cardiology, allergy and many others. Child health and the diseases of children were taught in the early part of the century as part of general medicine; paediatrics now is a separate department. The same trends are apparent in the departmental hierarchy of teaching hospitals. There is a constant striving towards autonomy of administration and a competition for beds, for equipment and for teaching time on the part of the newer specialties.

Is this in the interest of the school and the furtherance of its primary objectives? Certainly the establishment of new units with separate budgets and separate physical facilities makes for new ideas and advances in knowledge. It does not always, however, result in better undergraduate teaching. There is a tendency to isolation in large departments, and there is frequently little knowledge of the methods or content of teaching in the neighbouring department. On the other hand, it may well be an advantage to the student to have basic principles presented from the viewpoint of several different disciplines. Rarely are departments disestablished. Indeed, with increased knowledge there will likely be an increase. For instance there is an obvious need for more strees on human genetics, both at all levels of teaching in medicine, and in the application of new knowledge in the clinical field. There are very few medically qualified geneticists in Canada and until departments or sub-departments of human genetics are established it will be difficult to train Canadians for future needs.

Not all faculties and schools of universities are organized on the "department" basis; notably law, forestry and schools of social work seem to function satisfactorily on a unitary system. Some departure from recognized departmental arrangements in faculties of medicine is being considered. There have been suggestions to establish common admission wards in teaching hospitals, where all but acute surgical emergencies would be the responsibility of combined teams of physicians and surgeons. When diagnostic procedures have been completed, it would be necessary to transfer some patients to divisions where special facilities are available, e.g., neurosurgery, orthopaedic surgery, etc. In the meantime the undergraduate clerk would have an excellent opportunity to observe the place of the physician and the surgeon as co-workers and colleagues, and the impression of an unwholesome dichotomy of medical care might be corrected. Moreover there would be no further need for separating in time the clerkships in medicine and surgery. It is true that there is a gratifying growth of the conference idea, bringing together the neurologist, the neuroanatomist, the neuropathologist and the neurosurgeon – the thoracic surgeon, the physician and the pathologist – the vascular surgeon, the cardiologist and the physiologist, but the discussions in such conferences generally are more likely to be at the graduate than the undergraduate level.

SCHOOLS, DIVISIONS AND INSTITUTES

An interesting development in the University of Montreal is the establishment of "schools" which report to the Dean of the Faculty of Medicine. A school of dietetics enrols young women in a four-year academic programme with internships in the summer months, and graduates its candidates with excellent qualifications as dietitians and the degree of B.Sc. A school of rehabilitation medicine trains physical and occupational therapists, and arranges programmes for doctors who wish to specialize in rehabilitation and physical medicine; and another "school" trains candidates for a diploma in laboratory technology.

The term "division" is also used in some faculties to denote a rather wider responsibility than that denoted by a department. In one faculty a division with a director is responsible for the entire organization of graduate, post-graduate and continuing medical education. Another division assumes, as does a "school" in the University of Montreal, the teaching in the field of rehabilitation medicine.

Another development in the anatomy of medical education and research in Canada is the "institute". In some instances an institute may be established to forward the accumulation of knowledge and experience in a particular field and may include service to patients, as in the Montreal Neurological Institute. In others the objective is research and graduate teaching. Or an institute may be a device for cutting through departmental boundaries and enlisting expert and scholarly effort in a particular programme which is of immediate concern – e.g., cancer, or pharmacology and control of drugs. But although we may in the future see trends towards consolidation both in the basic sciences and the clinical fields, the "department" will remain the characteristic unit of schools and faculties of medicine.

RELATIONS WITH TEACHING HOSPITALS

The clinical laboratories of medical schools are the teaching units and out-patient clinics of the hospitals which are affiliated with the schools. There is as yet no hospital in Canada which is owned and operated by a university, and there is the widest variety of agreements, arrangements and contracts under which various hospitals permit the use of their facilities for instruction and experience of students, both undergraduate and graduate, in the medical field. The most satisfactory arrangements, both for the university and the hospital, are those whereby under some joint arrangement (1) an agreed number of beds are set aside as a teaching unit or series of units, (2) that no appointment to the staff of these units may be made unless by agreement of the sponsoring university with the hospital, and (3) that these jointly appointed physician-teachers will thereafter hold rank both in the hospital and on the staff of the Faculty of Medicine. Not all schools have found it possible to achieve such agreements with all the hospitals which are used for teaching purposes, and there is a tendency on the part of some hospitals to be rather jealous of their own autonomy and to resist the encroachment of outside authorities.

The ownership and management of hospitals is usually vested in boards of trustees or in religious orders. In the latter case, there may or may not be lay advisory boards.

Since the advent of hospital insurance, the teaching hospitals are not as dependent as formerly on the support and prestige which the universities could previously give them in their constant struggle for financial security. For the most part their annual budget is assured. Moreover, the trustees may see as their particular duty the provision for the care of the sick, and may not have a clear understanding of the problems of the medical school. There is, in most instances, no provision for representation of the medical school on the governing body of the teaching hospital. The problems of professional service are brought to the board of trustees by the chairman of the medical board, who should, ideally, be a member of the medical faculty if suitable agreements between the school and the hospital have been effected. Unfortunately, however, in some instances the chairman of such an advisory board is not a member of the staff of the medical school.

We have become aware, after visiting all the medical schools, that the present arrangements for liaison between school and teaching hospital leave something to be desired. (See Chapter 6.) Perhaps it is impossible to achieve the ideal situation with the present system, but we think much could be done to improve the current status. In the United Kingdom not less than five members of the university staff sit on the Birmingham United Hospitals Board. In the London medical schools, both at the administration and the board levels, there is difficulty in determining any differences in aims or objectives between the school and the hospital. In the United States, of course, in some instances the university owns and operates the principal teaching hospital.

RELATIONSHIP AND TEACHING RESPONSIBILITIES IN OTHER FACULTIES

Many universities in Canada which have medical schools have developed faculties in the associated fields of health: dentistry, pharmacy, nursing, physical and health education. It is obvious that students in these fields require teaching in the same basic science fields as the medical student. It seemed, therefore, perfectly natural that students in these new faculties should take their instruction in anatomy, biochemistry, in pharmacology, physiology, pathology and bacteriology, in the departments of the Faculty of Medicine which had already been established. Moreover, it is much more likely that a large department with varied teaching responsibilities could secure good teachers and good research workers than a small one catering to a small number of students. In several of the medical schools the basic science departments such as physiology, anatomy and biochemistry teach also in the Faculties of Arts and Science, and are very important departments in the graduate schools of the large universities. These factors have all resulted in a considerable change in the administrative and teaching situation which existed before World War II. The administrative problems of a medical faculty in those days were relatively simple, little research work was carried on, the number of students was smaller, and in only a few schools were there the problems of teaching in several other faculties.

But the medical schools' responsibilities and relationships to other independent faculties growing up beside them in the health field are only part of the problem. Medicine has become increasingly complex in the last quarter century, and to practise it efficiently and economically many different types of skilled personnel are needed, and these can be educated properly only within the environment and atmosphere of a medical centre. Examples are: physical and occupational therapists, radiographers, laboratory technicians, dietitians, and speech therapists. (See Chapter 13). Members of the teaching staff of a Faculty of Medicine find themselves inevitably involved in the provision of training facilities and the actual teaching of many of these personnel. The arrangements for their instruction vary in different medical schools. In some instances the university provides an organized programme of study with examinations, followed by the award of a diploma (or sometimes a degree), by the Senate. In others the instruction is organized by members of the Faculty of Medicine, but the examinations are conducted and the certificate or qualifications given by, e.g., a national professional society, such as the Canadian Society of Radiographers or the Canadian Society of Laboratory Technicians.

Details of training in these various fields will be described elsewhere in the Report, but reference is made to them here to give the reader some idea of the steadily increasing complexities of the whole field of medical education. The question of graduate education and post-graduate education will also be dealt with in another part of this Report, but from the point of view of administration and financing, it is an integral part of the medical school which, again, is an integral part of the university. It is doubtful whether the university always understands the responsibility it assumes under the heading "Faculty of Medicine". Each year, as the budget of this particular professional faculty is presented to those who have to deal with the finances of the entire university, it is easy to understand their surprise, and, sometimes, failure to appreciate the need for ever-increasing amounts of money, while the numbers of undergraduate medical students remain approximately the same.

Many attempts have been made to determine the actual cost to the university of the education of a medical student: the total cost of the instruction, supplies, facilities, and overhead, divided by the number of students. This is a most difficult procedure, but as it is being computed now in several schools in the United States under a method devised by A.J. Carroll,[1] it seems that, after all, the annual cost of undergraduate medical education may not be so far out of line with that of other professional fields. In two Canadian schools where rough estimates have been made, costs have varied from $2,000 to $5,200 per student per year. This merely indicates the disparity of the methods used and points up the need for intensive study on the part of universities to make an accurate estimate of the cost of educating students in different disciplines.[2] Be that as it

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[1] Carroll, Augustus J., *A Study of Medical College Costs*, Evanston, Ill., The Association of American Medical Colleges, 1958.

[2] A study of the costs of medical education in 12 Canadian universities was begun in 1963 by the Association of Canadian Medical Colleges and the Accounting and Statistical Research Committee of the Canadian Association of University Business Officers. A similar examination of the special costs of teaching hospitals has also been initiated by the ACMC beginning at the Royal Victoria Hospital in Montreal.

may, it remains a fact that faculties of medicine to account for a very large proportion of the total university spending, and because an increase in the provincial grants to universities has depended very largely on the provision for larger numbers of students, the university will probably find itself in increasing difficulties in finding the funds, and in justifying to other faculties the spending of increasing amounts on faculties of medicine.

THE HEALTH SCIENCES CENTRE

The members of this group have been impressed with the development of Health Sciences Centres in certain universities in the United States and the plans for new medical centres in the University of British Columbia, the University of Montreal, and Laval University. The centres at Gainesville in Florida, and Lexington in Kentucky have evolved from a common idea. Several workers in the health fields, notably doctors, dentists, pharmacists and nurses, although they have been brought up in separate disciplines at universities, realize that more and more they must work together for a common objective, and that to do their work effectively they must have a sufficient number of skilled paramedical personnel. Moreover, in every instance the undergraduate education, both of the professional personnel and the auxiliaries, can be carried out effectively only in an environment where basic medical sciences are taught, where research is constantly encouraged, and where patients can be seen and studied by students in other disciplines. In both American centres, the physical facilities include first-class well-equipped laboratories in the basic sciences, adequate for teaching and research. These laboratories are closely associated with investigational laboratories for clinical medicine, applied physiology, and applied chemistry; in the same series of buildings, a hospital capable of looking after some 400 patients, is equipped with all the latest facilities for investigation and modern therapy as well as teaching. In each instance, also, there is an extensive out-patient department, and a smaller building for patients not in need of active nursing who can be up and look after their own immediate needs.

Within this complex are the administrative offices for the faculties of medicine, dentistry, pharmacy, and nursing. Of course there are the laboratories necessary for the dental school to give practical instruction in that profession, and the laboratories necessary for the faculty of pharmacy for their particular students and also for the faculty of nursing; central departments of anatomy, of physiology, biochemistry, bacteriology, of pathology, of public health and social medicine which provide the necessary basic instruction depending on the particular discipline involved. In both instances, these organizations were organized and built under the direction of state governments. With grants from the Federal Government in Washington, it was possible to secure half of the $18,000,000 which was used to build the centre in Gainesville, Florida, and half of the $25,000,000 which was used to build the centre at Lexington, Kentucky. It was intimated that, if certain Bills presently before the Congress in Washington go through, it may well be that new ventures of this sort can and will be financed up to 60 per cent from federal grants.

The idea of these separate health or medical sciences centres in no way dissociates the development of medical education from the university. We did not enquire into the relation of the university Senate to the centre, but at Gainesville the whole operation was directed by a layman, and he was referred to as a provost. Dr. Harrell, who was the guiding genius in the organization of this centre as well as the originator of many of its unusual architectural ideas, felt that the university person who directed such an effort should unquestionably be qualified in one of the health sciences, and preferably be a graduate of medicine.

The main point is that the university has in these two instances decentralized to a remarkable degree its teaching and administrative responsibility in the medical sciences field. As we see it, this is a logical move in the right direction. In Chapter 7 there will be reference to the financing of a medical school. It is unlikely that the university will be able to find sufficient money from the usual sources to operate such medical sciences centres here in Canada. It will still have a very important responsibility to provide for the basic operation. We can see money coming from about four main sources. It should, of course, come from the central university budget; it is hoped that it will come from special funds, private and otherwise; it will come in increasing amounts from granting bodies which support medical research, and which will almost certainly have to finance in ever-increasing amounts the training of research scientists, the provision of career scientists and, it is hoped in increasing amounts, the provision of facilities to house all these efforts. We believe that consideration should be given to the provision of funds for such medical centres from provincial hospital insurance commissions and likewise from medical care commissions, if and when they are established.

The provision of universal hospital and medical care insurance seems to be engaging the attention of Canadians, and is an increasing concern of the Federal Government and the governments of the different provinces. It is obvious that no scheme for the adequate provision of the health needs of the people can be possible without the training of personnel: doctors, nurses, dentists, pharmacists, public health personnel, and all the others who are so urgently needed. Surely it seems reasonable that some small part of the very large funds which are to be spent each year in the provision for these health needs should go to those organizations which are responsible for training the personnel.

As we see it, any large university should welcome the development of a medical sciences centre within its organization. It will not in any way reduce its prestige; we see no interference with the Senate's authority in all academic affairs; we do see some possibility of a lessening of the demands on the Senate for the granting of diplomas and certificates at levels which should not necessarily be the concern of the Senate. The teachers in the medical centre must continue to be responsible for the training of paramedical personnel; the Senate might delegate to the medical sciences centre the right to issue diplomas and certificates.

There may be those who would say that this decentralization of all the activities in the medical sciences fields will work to the detriment of the teachers themselves, and tend to isolate them from the community of scholars which, in

the faculty of arts and science, is really the hub and mainspring of any university. This might be true if the physical facilities for the new centre were situated geographically too far away from the main university activity. Ideally, a medical sciences centre should be within reasonable distance of the rest of the university, but even though this should be impossible, we feel that the development is almost inevitable and that close association with the university will still be quite possible through the Senate and all its varied activities.

CONCLUSIONS

1. The responsibilities of directing a modern medical school demand the services of a full-time executive officer who should be medically qualified, and have the training and experience necessary to hold an even balance between the basic sciences, the clinical fields, and the development of research. A Dean should be appointed at an early stage of the development of a new school so that he can take an active part in its plans and organization. He will need efficient secretarial services and the assistance of an interested and efficient financial officer.

2. The medical schools should have the means to employ more geographic full-time clinical teachers and investigators. Remuneration, combined with the advantage of a university pension, should not be significantly less than the net earnings in consulting practice, after such deductions as the expenses of office and secretary which the man in private practice must provide. We are reminded that, in the United States, very large sums have been made available to allow schools to employ full-time teacher-investigators at salaries ranging from $15,000–$25,000.

3. That part-time clinical teachers be adequately compensated.

4. That in all agreements to be negotiated between universities and hospitals used for undergraduate teaching, there be a provision that the university shall be represented on the governing body of the hospital, by persons recognized as fully accredited and active members. (Should the hospital be owned by a religious order, the school representatives might sit on the advisory board.) That the representatives include the President of the university and Dean of the medical school (or their representatives), and at least two heads of clinical departments.

5. In the larger universities which have, as well as a Faculty of Medicine, faculties or schools in other health sciences fields, consideration should be given to a grouping of all these schools and faculties in a health sciences centre. Where it is planned to establish new medical schools with university-sponsored hospitals, the planning should be in line with this health sciences centre principle.

   The responsibility for the operation of such a centre should be vested in a small committee consisting of representatives of the Board of Governors of the university, the Deans or Directors of the schools within the centre, and

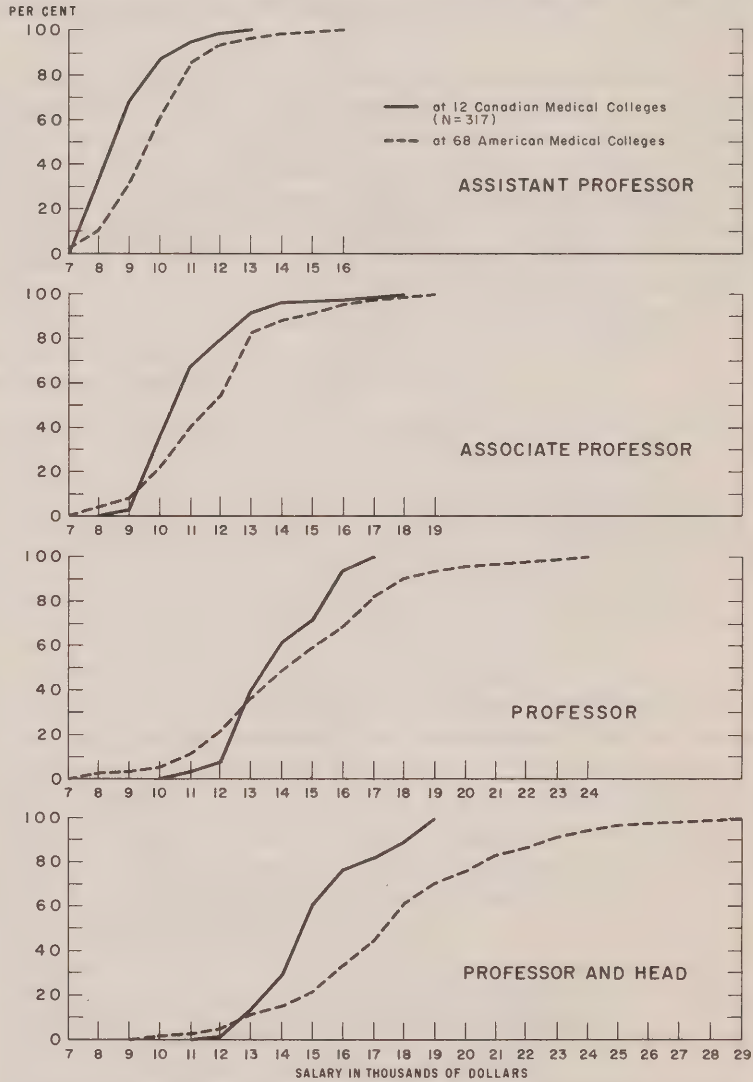
the Administrator of the university hospital, which is an integral part of the centre. Different patterns of administration will no doubt emerge, but the main principles are: (1) academic responsibility stemming from the Senate, but with some local autonomy for the management of courses of less than degree status; (2) financial and administrative responsibility stemming from the Board of Governors of the university, but vested in a small committee which should have considerable experience and interest in finance and general administration.

On the financial side, we suggest decentralization under a separate financial officer who would work very closely with the university comptroller. Indeed, we believe that the finances of a medical school, even under the present circumstances, are of sufficient complexity to warrant a separate financial officer who, although he might have his office in the Faculty of Medicine, would continue to work closely with the central financial administration of the university.

FIGURE 5-1

REMUNERATION OF TEACHERS IN THE BASIC MEDICAL SCIENCES IN CANADA AND IN THE U.S.A., 1961-62

PERCENTILE DISTRIBUTION OF SALARIES FOR FULL TIME SERVICE IN 12 MONTH APPOINTMENTS COMPARED AT FOUR PROFESSORIAL LEVELS



Source: Questionnaire returns to Royal Commission on Health Services from deans of medicine of Canadian universities. Data from U.S.A. was provided by the Association of American Medical Colleges in June 1962.

CHAPTER 6

THE TEACHING HOSPITAL

HISTORICAL

Until approximately the beginning of the 19th century, the role which the hospital played in medical education on this continent was small. Doctors were trained by the apprentice system with an individual physician teaching an individual student. Little medicine was practised in hospitals and the bulk of medical teaching took place in a doctor's office or in the home.

During the 19th century certain changes gradually took place. First, physicians found that it was more interesting to teach medical students on those aspects of medicine in which they were most interested. Therefore, instead of a physician training a single apprentice, physicians banded together to teach groups of students, each in his own particular area of interest. Thus were formed embryonic medical schools. These were not usually associated with universities nor were they associated directly with hospitals but rather with groups of practising physicians.

The number of these proprietary schools of medicine grew rapidly on this continent and early in the present century many more schools of medicine were in existence than the 100 which operate at the present time.

In the year 1909 the Carnegie Foundation, at the instigation of the American Medical Association, organized a survey to be performed by Abraham Flexner. For two years he visited, unannounced, faculties of medicine in the United States and Canada, following which he wrote a scathing report on the quality of the educational process. His Report[1] contained three main points:

(1) Most of the proprietary schools of medicine which were in operation should cease teaching forthwith.

(2) Only a few schools on this continent were providing a satisfactory academic atmosphere for the teaching of physicians.

(3) Never again should all of the teaching in any dapartment of a medical school be done by physicians who receive all of their remuneration from other sources. There must be at least a nucleus of full-time teaching staff in each department of a medical school.

[1] Flexner, Abraham, "Medical Education in U.S. and Canada", *op. cit.*, pp. 2–18.

The Flexner Report was taken seriously by medical educators and most of the proprietary schools which were criticized so drastically did actually close their doors. Those that continued attempted to improve their status. The Report provided a tremendous impetus towards schools of medicine becoming parts of universities and attaching themselves to hospitals which could be used for teaching purposes. Thus it is in the years since 1915 when the full impact of the Flexner Report was felt that the teaching hospital has really come into being on this continent and in this country.

In the 50 years since this trend began, medical education in Canada has strengthened enormously. Certain of our teaching hospitals such as the Royal Victoria and Montreal General Hospitals at McGill, the Toronto General Hospital at the University of Toronto, the Hotel Dieu and Notre Dame Hospitals at the University of Montreal and the Hotel Dieu at Laval University have become great teaching centres.

Generally, these hospitals were associated with universities by contracts which allocated certain areas of responsibility to the university and others to the hospital. However, the factors which produced a strong affiliation were not the official contracts as much as the mutual interests which hospitals and universities shared. A number of factors tended to strengthen the bond between the two. Hospitals had large numbers of charity patients who required treatment. The staffs of the faculties of medicine provided a high level of care for these patients without charge to either patient or hospital. In return these patients were used for teaching and it was on such patients that all physicians graduating in Canada have been trained in the past.

A second factor which drew together faculties of medicine and their teaching hospitals was the partial dependence of the hospitals on charity. They could not charge sufficient fees to meet all of their costs and therefore were required to raise funds from the local community in an attempt to meet their deficits each year. Since an effective appeal for financial support was based on the teaching and research activities which went on in teaching hospitals, hospitals tended to look on these programmes as assets and to support them financially. Perhaps the best example of this in Canada is the Hospital for Sick Children in Toronto where a large full-time medical staff is paid by the hospital to do teaching and research – traditional university responsibilities.

In the main, the large hospitals which have become the teaching hospitals in Canada were not used for teaching purposes in their entirety. Rather "teaching units"[1] were developed within the hospitals.

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[1] Definition of a teaching unit by Association of Canadian Medical Colleges. "A clinical teaching unit, which may be an entire hospital or a designated hospital area, is one which provides opportunity for undergraduate and graduate medical education (not limited to the intern year) under the auspices of a Faculty of Medicine of a university.

The medical staff of a teaching unit is appointed jointly by the university and the hospital. The staff is organized in departments, the heads of which are appointed jointly by the university and hospital. The care of the patient in a teaching unit is the function of the team of staff-physician, resident, intern and clinical clerk, based on the principle of graded responsibility commensurate with the competence and level of training.

The teaching unit is a group of geographically isolated beds into which needy patients are admitted to a service rather than to an individual physician. The service is staffed by a senior physician or surgeon, by one or more junior staff physicians or surgeons, senior residents, junior residents, interns and at appropriate times during the year, medical students. The staffs, caring for the patients in this service without charge, are appointed jointly by the university and the hospital and are required to meet the approval of both groups.

The teaching unit presents many advantages. It provides the medical student, the intern and the resident with patients over which he has certain responsibility under supervision. It provides an area in the hospital in which treatment methods can be evaluated under controlled circumstances. The development of the teaching unit was responsible for much of the progress made in medical education in this country. In addition, the teaching hospitals in Canada have pioneered improved quality of hospital care. Most of the clinical research which has resulted in advances in medicine has been conducted in these hospitals.

PRESENT TRENDS

Three factors have tended to weaken the strong Medical School-Teaching Hospital unity in recent years:

1. As a result of prepaid medical schemes, there has been a steady and progressive decrease in the number of charity patients available for teaching, and the inter-dependence of the hospital and the faculty has been reduced.
2. The Hospital Insurance and Diagnostic Services Act[1] makes no reference to medical education and specifically excludes coverage of costs of medical research. Provincial hospital commissions have mostly taken the attitude that the additional costs of the teaching hospital which previously had been supported by voluntary funds, were not a responsibility under the national hospital insurance agreement. Therefore, although every dollar required for the provision of routine care to the patient is provided, no single penny is available for the added costs associated with medical education and with medical research. Further, the support of hospitals by government reduces the enthusiasm of the public for fund-raising programmes, and hospitals have not been able to continue to support medical

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In the teaching unit, all the resources of the staff are brought to bear on the problems of each patient. The staff has the double responsibility of caring for the patient and teaching the student. Exemplary treatment of the patient should always result. The unit provides the most stimulating setting for clinical research and for the assessment of new methods of treatment. The total number of patients available at all times for clinical teaching should be equal to from ten to twenty for each final-year student.

The out-patient clinic provides an opportunity for a teaching experience under conditions which resemble practice in the home or office. Out-patient clinics should be organized and supported for diagnosis, ambulatory treatment and follow-up care, staffed by university teachers and available for active teaching. For effective teaching, ideally there should be one new admission *per diem* for each student who is taught in the out-patient department."

[1] Hereinafter referred to as Bill 320.

education and medical research. The costs have been thrown back directly on the small and already strained budgets of the universities, and it is a fact that the universities have been subsidizing the national hospital insurance plan. To exemplify this situation, in most medical schools approximately half of the costs per year go to the payment of salaries of physicians and other staff who work full-time in the hospitals of the community. In addition to doing teaching and research they are responsible for running the hospital services, that is, the department of surgery, the department of medicine, department of psychiatry, etc. The salaries of these individuals and of their supporting staff, secretaries, technicians, librarians, and the like must come entirely from university sources of funds although they are spending approximately 50 per cent of their time doing hospital work.

3. The advent of prepaid, government-supported hospitalization has produced another problem in teaching hospitals. In the past the out-patient department has been the centre of a great deal of medical teaching. Like the teaching unit, it provided the environment in which the student could take responsibility for patient care under supervision of his instructors. Because an out-patient department offered services to patients who usually suffered from common and moderate illnesses, it represented the only place where the student was presented with conditions somewhat similar to those which he would encounter in his office practice. The maintenance of the out-patient department or the provision of some other means of bringing the student into contact with common illness is of great importance to the future of medical education.
   Under the existing Act, provincial governments are at liberty to decide whether or not out-patients' services in hospitals will be supported, and few choose to do so. Thus, in most teaching hospitals the out-patient department financing is separate from, and less adequate than, the support of in-patient services. No differentiation is made between the teaching and other hospitals in the support of out-patients' services, and as a result, in most teaching hospitals the possibility exists that the out-patients department may deteriorate or even cease to exist.

Because of these factors, the strong unity of university and teaching hospital, established slowly over the years, has weakened and both medical education and research have suffered.

FUTURE DEVELOPMENT

The reduction in the number of public ward patients who in the past have been used for teaching, is not unique to the Canadian scene. In the United States increasing health insurance coverage has caused a sharp reduction in "charity patients". In the United Kingdom with the development of the national Health Service the "charity patient" has disappeared. However, in that country

the health service has taken medical education into consideration. The teaching hospital is a recognized entity governed by a separate board with strong university representation. The service supports the increased costs of education and research in these hospitals. The university hospital has been made the focal point of a hospital district in each area and the diagnostic and treatment problems of the region are referred to this centre of exemplary medical care.

The only consistently successful manner in which patients can be made available for teaching under the circumstances which exist in Canada, is to have either separate hospitals attached to universities or specific areas in community hospitals set aside for teaching and research purposes. The standards of care in these teaching hospitals or teaching units are higher than those available elsewhere in the community, and patients will gladly enter them in the full knowledge that they will be used for teaching and clinical investigation. These hospitals become the referral centres for the region; they pioneer the advances in medical care made in Canada and are the focal points of undergraduate and post-graduate education of physicians and other health workers. Under these circumstances, the teaching unit or the separate teaching hospital which has been valuable in the past becomes essential in the future.

The rewriting of Bill 320 to include appropriate costs of medical education is urgently required. Appropriate costs should be at least 50 per cent of the salaries of university employees who devote that part of their time to hospital functions. They should also include the servicing of areas required for teaching and research in teaching hospitals.

In addition, Bill 320 specifically excludes research as a field of support, although much of the research is in the nature of operational research of the care which takes place in hospitals. Thus, in this field also, the university subsidizes the hospital commission. It is a matter of urgency that the support of appropriate research be included under acceptable costs by the provincial hospital authorities. A full discussion of the role which hospital insurance commissions should play in the financing of the clinical aspects of medical education is found in Chapter 7.

CAPITAL COSTS

The absolute necessity of developing either university hospitals or university teaching units in appropriate hospitals requires that consideration be given to the capital costs of their construction. This matter is fully discussed in Chapters 7 and 12.

AVAILABILITY OF TEACHING PATIENTS

With the advent of universal prepaid hospitalization and the prospect of prepaid medical care, the "charity patient", traditionally the source of clinical material, will disappear from our teaching hospitals. Agreements and customs must be created by which bed-patients will be used for teaching, even though the cost of their professional care is insured.

But the out-patient department, as run by the hospital, can no longer pose as a model of office care, since patients who come to it are subject to much more elaborate investigation than is possible in a physician's office. A substitute might be provided by a family care programme, in which the student, under supervision, would visit patients in their homes and in physicians' offices. Alternatively, if a segment of the population were made available to medical schools, the *office practice* on this group of patients might be delegated to the students and take place in the out-patient department of the teaching hospital.

Sufficient study has been made on the various forms of prepaid medical care in effect in other countries to understand their impact on patients for medical teaching.

In Britain – where a panel system is in effect – no problems have arisen with medical education. The teaching hospital is the planned centre of a hospital region and undertakes the management of all problem cases not readily cared for in the surrounding hospitals. The general physician's remuneration is not dependent upon a fee-for-service system and therefore there is no economic disadvantage associated with referring patients to the hospital. The specialist physician caring for hospital patients is remunerated on a sessional basis, e.g., a fixed sum based on the number of half-days or "sessions" during which he engages in a combination of teaching, research and service. As a result of these arrangements, the wards of teaching hospitals are well filled, and the out-patient departments are operating to full capacity. Thus, under this system of payment for medical care, no problems exist in obtaining patients for teaching.

In Sweden the form of prepayment is based upon fee-for-service for treatment in the home or in the physician's office. The patient can recover 75 per cent of a standard fee from the state if he produces a receipted bill for the whole amount. However, if a patient enters hospital his treatment is free. Again there is no economic loss to the physician who refers the patient to the hospital and the teaching hospital beds and out-patient departments are well filled.

The form of payment for medical care most frequently discussed for Canada is that based entirely on fee-for-service with the general physician receiving remuneration for all work done on the patient whether in the home, the office or the hospital. One can only surmise the impact of such a plan on the number and types of patients in teaching hospitals but all evidence would indicate that *it would have a profoundly deleterious effect on the supply of patients for teaching and research.* The teaching unit or the teaching hospital must be a carefully controlled area, staffed with a limited number of physicians and surgeons carefully selected because of their knowledge, skill, teaching and research interest. To any but the small number of medical staff on the teaching hospital the referral of patients to such a unit or hospital will mean the loss of fees available to the physician for services rendered in hospital. Inevitably the physician will prefer, within the interests of his patient, to admit the patient to a non-teaching hospital where he can continue his care. Under universal medical care the "charity patient" from whom he could formerly expect no fee and who under existing circumstances is referred to the university hospital,

will have ceased to exist and every patient will be a potential source of income to him. There will always be very seriously ill patients or very puzzling cases whose care the physician will gladly entrust to the teaching hospital. However, these cases are not numerous and they are not suitable patients on which students can receive all of their instruction.

To meet this dilemma, there must be some advantages built into the teaching hospital or the teaching unit which will make the physician wish to refer patients and the patient wish to enter. These advantages should include exceptionally able staff. However, there should also be exceptional facilities within the hospital making possible methods of investigation and treatment that would not be readily available in the average general hospital. The hospital should be particularly attractive and efficient so that patients will wish to use it. Above all, the quality of care should be the best available to the population served by the medical school. Unless these special advantages are available in teaching hospitals, there will be serious problems in providing patients on which the physicians and other health workers of the future can be taught. If, however, teaching hospitals are so staffed and equipped and provided such a high standard of care, patients in numbers sufficient for teaching and research purposes will be attracted to them.

In many teaching centres today, the teaching units are only a part, and at times a small part, of a large general hospital. It will be difficult under these circumstances to provide the atmosphere required to attract patients and, in fact, to make the teaching unit a recognizable entity. It is almost inevitable that most medical schools will require relatively small but complete separate teaching and research hospitals in which to centre the greater part of the academic programme.

AGREEMENTS BETWEEN MEDICAL SCHOOLS AND AFFILIATED HOSPITALS

In addition to modifying the existing legislation to permit acceptance of the additional charges required to support teaching hospitals and teaching units, it is necessary to give thought to the relationships existing between medical schools and service hospitals in which teaching units exist.

Although it is probable that many medical schools will build small, separate teaching and research hospitals as part of Health Sciences Centres in the future, the clinical training of undergraduate and graduate students will continue to depend in part on hospitals designed primarily to provide community service.

A study of the highly complex relationship between medical schools and hospitals has recently been completed by the Graduate School of Public Health, University of Pittsburgh, for the Association of American Medical Colleges. The study embraced 85 medical schools with which a total of 497 hospitals were affiliated. After observing the great variation in the success of the affiliations

they have stressed a number of key issues which must be considered if effective affiliation is to be achieved. These issues, modified to fit the Canadian scene, follow:

Shared Goals

The common goals of education, research, patient care, and community service should be shared by the medical school and its affiliated teaching hospital. It is clear that the medical school will be primarily interested in education and research and the hospital will be mainly concerned with patient care and community service. If the interests of the two affiliating bodies are allowed to come into conflict neither the medical school nor the hospital can achieve its full potential.

Faculty and Hospital Staff Appointments

Power of appointment to the faculty resides in the medical school. The members of the staff of the affiliated hospital who serve as medical school faculty in the undergraduate teaching programme are selected and appointed through the joint effort of the medical school and the hospital, with the initiative taken by the medical school. The hospital has the sole responsibility for the appointment to its staff of those who do not participate in the undergraduate teaching programme. The chief of a hospital service will be the member of the active staff who is senior in the appropriate university teaching department. When a department head is to be selected the medical school should initiate the selection procedure and the final appointment should be made with the joint approval of the medical school and hospital.

Interns and Residents

Interns and residents have a moral and legal responsibility to the hospital in which they work. In a hospital affiliated with a medical school, the selection and appointment of house officers should be largely controlled by hospital staff members who are on the medical school faculty. The selection and appointment of interns and residents is, therefore, a joint undertaking of the medical school and the teaching hospital. If non-faculty members constitute a substantial portion of the staff of an affiliated hospital or service, their interests are represented in the process of selecting and appointing interns and residents. The medical school recognizes the responsibility held by interns and residents for teaching undergraduate medical students in an affiliated hospital and, at an appropriate level, may give teaching appointments at the medical school to such house officers. The education, training, and supervision of interns and residents, like their selection and appointment, is largely controlled by hospital staff members who are on the medical school faculty.

Medical Students and Patients

In their clinical education, medical students are responsibly involved in the management of the care of patients. The student's involvement is through his participation with faculty and house staff, functioning as an organized unit, responsible for patient care. Under ideal arrangements the student may replace the intern in many respects. He is encouraged to be an active member of the treatment team. His activities include the taking of a patient's history, diagnosis, proposing diagnostic and therapeutic procedures, and recommendations for the disposition of the patient upon discharge. All student work is critically reviewed with the student by the house staff and faculty members. After diagnostic and therapeutic procedures are approved and ordered by the responsible physician, the student's experience includes participation in the performance of many of them. The student's history, his record of the physical examination, his proposals for diagnostic and therapeutic procedures and for disposition of the patient are included as part of the patient's medical record, at least for the duration of the current admission. Students should be encouraged, to the greatest extent possible, to follow their patients through their in-patient stay, their out-patient visits, and, when feasible, at their homes.

Adequate space and facilities within the hospital necessary for a successful programme of clinical education are provided by mutual agreement between the medical school and teaching hospital.

Patients and Teaching

All patients admitted to a specifically designated teaching unit of an affiliated hospital are admitted with the understanding that they will participate in the teaching programme. Exception is made only when the senior physician in charge of the teaching unit feels that participation in teaching might harm the patient.

Patient Care

Care of the highest standard, through physicians' and other services, is provided for all patients in the affiliated hospital. The hospital recognizes the opportunity afforded by its affiliation with a medical school to improve continuously the standards of patient care throughout the entire institution. The medical school recognizes its obligation to assist the hospital in this effort.

Research

Good medical research is an essential element of an affiliation. This encompasses laboratory studies in the organization and administration of medical and hospital services and other related investigations. Research in an affiliated hospital is initiated by the members of the medical school faculty.

In the conduct of all clinical research, the hospital has the primary legal duty to make sure that due regard is given to the personal rights, safety, and understanding of the patients involved. The medical school assists the hospital in fulfilling this obligation. Proposals for research programmes and projects are first approved by the appropriate medical school department chairman and/or hospital service chief. Approved proposals are then reviewed jointly by medical school and hospital administration in order to ensure that the necessary space and facilities for the proposed research will be available.

Affiliation Agreement

The agreement on goals and responsibilities of the medical school and the affiliated hospital is stated in writing, is signed by designated representatives of the two institutions, and is subject to periodic review. The form and detail of the agreement are in accord with the particular needs of the institutions concerned. The agreement embodies procedures for the solution of problems arising between the affiliated institutions.

It is imperative that spokesmen of university policy have membership on the board of trustees of the hospital. The president of the university or his representative, and the dean of the faculty of medicine or his representative, would provide adequate representation.

In many provinces in Canada it has been traditional that no medical staff members may sit on the board of trustees of a hospital. In a university hospital or a university affiliated hospital, it is imperative that the board have ready communication with the heads of clinical departments. The board of trustees should have as members, in addition to the dean, at least two heads of medical school departments as the minimum required to assist in permitting solution of the complex problems of integrating teachers and service functions.

CONCLUSIONS

1. Changes should be made in the Hospital Insurance and Diagnostic Services Act to permit the inclusion of appropriate charges entailed in medical education and research.

2. Agreements between medical schools and affiliated hospitals should provide for:

a) Joint appointments of teaching staff by university and hospital boards.

b) Representation of the university on the hospital board to include the president of the university and the dean of the medical school or their representatives.

c) Representation on the hospital board of at least two heads of clinical departments of the medical school.

d) That the issues mentioned in the Pittsburgh study be the subject of detailed discussion between teaching hospital authorities and medical school authorities, with a view to a thorough mutual understanding.

CHAPTER 7

FINANCING OF MEDICAL SCHOOLS AND TEACHING HOSPITALS

THE MEDICAL SCHOOL – A NATIONAL ORGANIZATION

It is clear that some modification of present funding arrangements for medical schools in Canada must be created if universities are to be asked to continue to produce trained physicians for this country. Although most medical schools admit a majority of their students from the provinces in which they are situated, there is a great deal of overlapping, and in many medical schools one finds students from several provinces and, indeed, from other countries of the Commonwealth and the United States. Thus the medical school tends to be more a national than a local or provincial asset.

There are several reasons why the federal government has responsibilities for providing support for medical education.

1. If Canada embarks in the near future on some form of general medical coverage, there will be a greater demand for medical care. The responsibility for providing an adequate supply of physicians for a Canada-wide scheme cannot be left entirely to a small number of universities to provide from their ordinary sources of funds.
2. Physicians move readily from province to province in Canada. It is unusual for a physician to take his undergraduate education, his graduate training, and spend his years in practice in one area. Thus a medical school is much more than a local asset.
3. Federal agencies frequently ask medical schools to accept the responsibility for educating students from under-developed countries. Particularly in teaching hospitals the resident and research staffs are, to a significant degree, made up of physicians from less favoured countries, such as the Middle Fast, Asia and Africa. Through its Colombo Plan the federal government has encouraged students and graduate physicians to come to this country for assistance in their education. It is not reasonable that the costs of such an arrangement should be borne by universities from their ordinary sources of funds.

4. The federal government now provides approximately 50 per cent of the cost of hospital insurance in Canada. Through this sharing arrangement it assists in the education of nurses, technicians, radiographers and other health personnel. It is not clear why similar support should be withheld from medical education.

PRESENT ARRANGEMENTS

At the present time 12 universities in Canada have accepted the responsibility of educating physicians. Without exception they have found this responsibility an onerous one. The costs of education in a medical faculty are higher than in most other faculties and many factors are involved in these high costs. The necessity of small group teaching, the high costs of equipment and supplies, the necessity for research to accompany teaching, all play a role.

Until a few years ago the medical schools of Canada kept pace in satisfactory fashion with those of other countries and Canadian physicians graduated from faculties were as capable as most in the world. In recent years, however, several factors have entered the situation to tend to reduce the quality of Canadian physicians, as compared with those produced in other countries.

The first of these influences is outlined in Chapter 6. The strong affiliation of teaching hospitals and medical schools which resulted in both hospital and school supporting medical education and medical research, has been broken by failure of the Hospital Insurance and Diagnostic Services Act to mention medical education and failure to include medical research. As a result, medical schools are now subsidizing the National Hospital Insurance programme, and the quality of clinical teaching has not continued to improve.

This has not been true in other countries which embraced government support of health care. In the United Kingdom the teaching hospital is the recognized centre of the hospital region. It is accepted that its costs will be from 25–30 per cent higher per patient-day than those of any other hospital in the region. Its facilities are greater, its staff is larger and its patient clientele is assured because it is the only hospital in the district that can look after problem cases. In Sweden, despite a prepaid system outside the hospital, the same arrangements prevail inside the hospital as occur in the United Kingdom and thus the number of patients and the facilities for training of physicians are assured.

The second influence which increasingly enters the scene is represented by the rapidly spiralling costs of medical education. Standards are being set in other countries which our universities are desperately trying to meet without adequate sources of funds. In the United Kingdom the costs of clinical teaching are considered part and parcel of the health-care plan. In the United States the solution was found in quite a different way. It was painfully obvious that medical education needed more financial support than it was receiving from education budgets. There were problems associated with the granting of funds from federal sources to state-supported medical schools for educational purposes. Accordingly, the Federal Government of the United States has undertaken to support medical schools indirectly by huge increases in the grants available for medical research; much of this money is available to medical schools.

The 12 universities in Canada which have undertaken the responsibility for the education of physicians have been desperately trying to find the funds to put their medical schools in a reasonably favourable position in relation to schools in the United States of America. The medical schools are taking an embarrassingly large percentage of the total university budget for a very small percentage of the total students. In one university, 9.5 per cent of the total budget goes to the support of the 1.5 per cent of the students who are registered in the medical school. (See Chapter 10.)

Despite the heroic efforts that have been made by universities to keep pace with what is going on in medical education in other countries, they are fighting a losing battle.

Over the long open border between the United States and Canada there is great freedom of interchange of medical scientists but the flow is usually southward. Over 5,000 Canadian-educated physicians are now living within the United States. Most of these physicians have gone there to practice, but in recent years a much more serious trend has developed. Partly because Canada cannot compete either in salary scales or in working conditions, she is losing some of our most able medical educators to that country. More important, perhaps, is the fact that with the facilities and staff that can be obtained under these very generous research grants, there are research potentials in the United States which are not available in our country. Thus the very core of the system of medical education and medical research in this country is in danger of being lost.

In recent months a new factor has entered the situation; legislation has been enacted in the United States which provides federal sources of funds for the building of teaching facilities for medical schools in that country. Thus teaching hospitals and buildings in which the basic medical sciences can be taught will now be very generously supported by the Federal Government through capital as well as operational grants.

Under the new health programme, there will be provided over the next three years, $105 million for assistance in the construction of new teaching facilities in the health science field, $35 million for new dental schools, $35 million for modernization of existing medical, dental and other professional schools, and $61.4 million for loans for students in the health fields.

In summary, after achieving a high level of medical education in our country, two apparently unrelated forces have come into being in recent years which have reduced that level. These are:

1. The lack of recognition that teaching hospitals must receive a greater degree of support than regular general hospitals.
2. The rapid increase in support of medical education in other countries, which draws some teachers from Canada.

The urgency of the present situation is brought to the attention of the administrators of Canadian medical schools and universities on each occasion that the schools are visited by an "accrediting team" representing the Association of American Medical Colleges and the American Medical Association.

A team inspects each American school at intervals of approximately eight years. In preparation for the inspection, the school must send to the central office in Chicago, a detailed account of organization, financial support, roster of staff, facilities and support for teaching and research, programme of teaching, hospital affiliation and many other pertinent matters. Each member of the visiting team has been furnished with the report before the visit, and the examination which follows is thorough and critical. The team reports to both the Association of American Medical Colleges and to the Council on Medical Fducation and Hospitals of the American Medical Association. If the school meets the necessary standards it is listed with the Chicago office as approved and the approval is recorded in the annual educational issue of the Journal of the American Medical Association. Should it not meet the required standard, it may be put on probation until it corrects the deficiencies.

The programme of regular inspection was established after the publication of the Flexner Report in 1909 had exposed the considerable number of proprietary medical schools which were graduating doctors of medicine although ill-equipped to provide a satisfactory education. The American Medical Association was rightly concerned about standards of medical education and, working with the Association of American Medical Colleges has been active for the past 50 years in setting and progressively improving the standards which must be maintained in the schools on this continent.

The Canadian schools are associate members of the Association of American Medical Colleges. They were told that, if their graduates wish to practise or (in some states) undertake graduate training in the United States, they must invite inspection for accreditation. For the past 15 years when a Canadian school has been inspected, the team has included, as well as three Americans, one or two Canadian educators, nominated by the Association of Canadian Medical Colleges.

These visits are welcomed by the Canadian schools, for an inspection enables the school to examine its own anatomy and functional state in a way which it would be unlikely to do, if such a visit were not impending. It also enables the Dean and other excutive officers to explain to the President of the university and his associates, weaknesses in the structure, deficiencies in staff, lack of physical facilities and inadequacies in budgets, and to have these facts backed by the opinion of neutral observers. Canadian schools from time to time may wish to have expert and objective opinion on some controversial or novel situation such as organization, hospital relationships, new departments or such like. The Association of American Medical Colleges and the American Medical Association have always been most helpful in sending suitable experts to report and advise the University when such occasions arise, and they have been asked for opinion and advice.

Recently, the American members of the visiting teams have found it difficult to judge the Canadian schools by the standards with which they are familiar in the United States – particularly when such standards relate to general budgets, research facilities and the provision for full-time teachers and investigators. The country is faced with the possibility that Canadian schools may no longer appear in the approved list, which contains *all* the American schools. This would be a rather

unenviable position because having enjoyed whatever prestige accreditation implies, it would suggest derogation to another and rather secondary position in relation to present American standards. (It is only fair to note that there is no similar accreditation by American authorities of any of the schools in Great Britain or other Commonwealth countries.)

CAPITAL COSTS

The buildings and equipment necessary for the teaching of medicine are complex and costly.[1] In terms of the present arrangements for their financing, one must divide the building facilities into two groups; preclinical and clinical.

Preclinical Facilities

Departments of Anatomy, Physiology, Biochemistry, Pharmacology and Microbiology are housed in buildings which are developed to provide facilities for teaching and for research. The provision of teaching space is relatively little different from that of any other building devoted to science, although the teaching laboratories for students are somewhat more costly to build than are lecture halls and other less well equipped teaching areas. However, preclinical departments would be sterile if the department members were not actively engaged in research. Therefore, a very significant amount of space, approximately equal to that required for teaching, if needed to provide research facilities for the staff of the preclinical departments. This space is extremely costly to build, requiring much in the way of additional equipment and services.

As a result, the basic medical sciences' buildings in any university are among the costliest which the university must erect. The method of raising money to build preclinical facilities has varied widely. Unlike secondary schools, which are built with funds from municipal and provincial sources, medical schools have had to depend on the universities of which they formed a part, in securing special provincial grants, public subscriptions, bequests, the support of religious foundations and certain American philanthropic foundations. However, since the end of World War II has become increasingly apparent to provincial governments that if there is to be a reasonable supply of doctors, the universities must have special help in the establishment of medical schools. Recently the Government of the Province of Quebec has established a policy of giving special aid to those universities which have medical schools, and has given some promise of aid to another university which has undertaken to establish a medical school. The Prairie Provinces have very clearly demonstrated their willingness to make capital grants for the building of medical educational institutions. On the other hand, in the Maritime Provinces the one university in which there is an established medical school has had to depend largely on private bequests and donations for the support of its building programme. In the Province of Ontario the Government established in 1962 an Advisory Committee on University Affairs, and it presumably will survey the whole

[1] See Chapter 12, pp. 237–240, also Table 12–2.

situation of higher education in that Province and be prepared to offer the government advice on the building of new universities, the inclusion of new schools in existing universities and methods by which the capital costs involved can be met.[1]

Teaching Hospitals

The second type of facility required for a medical school is a teaching hospital or teaching units within general hospitals. These are much more costly to build than are service hospitals because they must contain teaching areas and expensive research space.

To provide space for teaching and research in a general hospital requires a building really twice the size of that which offers service above.

Thus, costs per bed in a teaching hospital may reach $40,000 per bed rather than the more usual $20,000 to $25,000 per bed for a community hospital.

Before the establishment of the Dominion-Provincial Construction Grant Programme which now aids in the building of hospitals across Canada, funds for the erection of all hospitals were provided by public subscription, by municipal grants, by private benefaction and , occasionally, by provincial grants. Many were financed entirely by religious orders. The development of a government grant system has done much to improve the quality and quantity of hospital beds in this country. But in any community which contemplates the establishment of a new hospital the people of the community must raise 35 to 50 per cent of the total cost.

Despite the fact that they have great influence on the medical care of the country as a whole, teaching hospitals receive the only regular construction grants. In fact there is relatively less support for the teaching hospital. The federal grant to a service hospital of $2,000 per bed and $2,000 for every 300 sq. ft. of certain specified types of floor space represents approximately 10 per cent of the total cost of the building. For teaching hospitals, because of the very significant increased cost per bed, the grant represents only between 5 and 8 per cent of the total cost.

Some provinces have demonstrated awareness of the extra needs of teaching hospitals. The provinces of Alberta and Saskatchewan have contributed significantly more to the capital costs of teaching hospitals than they do to community hospitals. The Province of Quebec is currently developing a very enlightened plan for assistance in the development of teaching hospitals.

The refusal of the federal and of some provincial governments to support the extra costs of teaching hospitals is in sharp contrast to the arrangements in other countries. For example, a new teaching hospital at the University of St. Andrew's at Dundee will cost in the neighbourhood of nine million pounds. The purely service elements of the hospital will be financed from national health service funds, and

[1] The government has more recently, (January 1964) announced the formation of a Ministry of University Affairs, under the guidance of a cabinet minister. The relationship of the University Affairs Committee to this new department of government has not yet been clarified.

the academic elements of the hospital, including the departments of microbiology and haematology and clinical investigation units will be financed by the University Grants Committee. At Lexington, Kentucky, and at Gainesville, Florida, new university health sciences centres including teaching hospitals, costing respectively $25,000,000 and $18,000,000 were financed to 50 per cent or more of their total cost by special grants from the Federal Government in Washington.

As a result of the difficulty in obtaining funds for construction, Canada's medical schools are inadequately supplied with the special facilities required in their teaching hospitals.

OPERATING COSTS

The average annual cost of medical education in Canadian universities has been estimated to run up to $5,200 per student. The university attempts to meet these costs from a variety of sources. As shown in Figures 1 and 2, the great bulk of the cost of teaching is borne by the university budget emanating in most instances from provincial and federal grants, student fees and endowments. The student fees provide only a small percentage of the amount although they are usually the highest fees charged by the university. Thus an allocation of a very significant portion of the total operating budget of the university is necessary for teaching the comparatively small numbers of students in the faculty of medicine. This may be difficult to justify if the grants to the university from provincial and federal sources are usually based upon the numbers of registered students. The enrolment of students in the faculty of medicine is determined by the number which can be served by the laboratory and clinical facilities available to the school.

Although research grants from federal, voluntary and American sources have increased significantly in recent years (Figure 3) these do not assist in meeting the direct cost of teaching medical students. In fact, the opposite is the case. The maintenance of space and facilities for research, and, usually, the salaries of senior investigators, remain a university responsibility, and each grant for project research received by the university commits it to significant costs. Despite the fact that the combination of teaching and research in medical schools is obviously desirable, universities find themselves in the paradoxical position of fearing to accept too many grants lest they reduce the effectivity of funds for teaching.

Thus the universities which have the responsibility to educate physicians for Canada lack buildings adequate for teaching and operating budgets large enough to offer the quality of medical education at the level provided in other Western countries.[1]

FUTURE PATTERN OF SUPPORT

The following suggestions are made concerning the future pattern of support of medical education in Canada:

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[1] See Chapter 12, pp. 240—241.

CAPITAL COSTS

It is clear that the development of new medical schools is very costly and should not be undertaken lightly nor on the basis solely of local ambition. It is suggested that provincial and federal governments utilize the research services of the Association of Canadian Medical Colleges to determine when and where new schools of medicine should be established. It is suggested that when the need for a school has been demonstrated, or when in the existing schools there is demonstrable need for expansion or replacement of teaching facilities, including hospitals, federal grants be made through the Department of National Health or other federal agency to assist in the costs of construction.

It is recommended that in the case of basic medical science buildings, the Federal Government's share should be 50 per cent of the construction costs.

It is suggested that in the case of teaching hospitals, the present grant of $2,000 per bed and $2,000 per 300 sq. ft. of laboratory and out-patient space be replaced by a construction grant in the amount of 50 per cent of the total cost of the hospital. It is clear that there must be some limitation on the number of teaching hospital beds and it is recommended that the usually accepted figure of ten beds per member of the graduating class in the medical school be considered as the maximum number so supported.

The method of financing described above should apply to all future developments in medical school construction. However, a programme to assist construction of research facilities in medical schools has now been under consideration for several years. The report of the Farquharson Committee, which was accepted in principle by government in 1960, pointed out that medical schools in Canada were seriously hampered by gross deficiencies of research space, and recommended that funds for capital costs of such facilities be provided at once. We feel that it is urgent and imperative that this recommendation be implemented, and funds made available preferably through the Medical Research Council. (See Chapter 10.)

OPERATING COSTS

University Sources of Funds

At present the university contributes to the education of physicians from its general federal grant, its provincial education budget (where applicable), its endowments and student fees. However, it is desirable that 50 per cent of the total cost of medical education be provided from other sources. This might be achieved through the following means.

Support under the Hospital Insurance and Diagnostic Services Act — An amendment of Bill 320 to include appropriate costs of medical education is urgently required. Appropriate inclusion should provide 50 per cent of the salaries of uni-

versity employees who devote a considerable part of their time to hospital functions, and the servicing of areas required for teaching and research within the hospital.

Bill 320 specifically excludes research as an area of support, although much of the research taking place in hospitals is in the nature of quality control of the treatment which goes on in the hospitals. Thus, in this field also the university subsidizes the Hospital Insurance. It is a matter of urgency that the support of appropriate research be included among acceptable costs under Bill 320.

The degree to which these moves will increase budgets in teaching hospitals will vary. Hospitals are involved in teaching to greater or lesser degrees. Undergraduate, graduate teaching and research will be concentrated either in teaching units of general hospitals or in university hospitals to varying degrees in each school. In these areas of concentrated teaching and research, costs will be substantially greater than in service hospitals. In England, where the teaching hospitals are given appropriate budgets, the increased costs in teaching units average about 27 per cent. The number of beds used for teaching and research will vary in different hospitals, and the extra cost in any hospital will vary accordingly.

It is suggested that each hospital which qualifies as a teaching hospital be required to prepare two budgets annually. The first, for the provision of routine care to patients, should be prepared by the hospital administration and negotiated with the provincial hospital authority. A second budget, for additional costs of teaching and research, should be prepared jointly by the faculty of medicine and the hospital, and jointly negotiated with the provincial hospital authority. A reference committee comprising of federal and provincial officials and medical educators should be set up in Ottawa to be available to judge whether or not the proposed budgets for teaching and research requests are reasonable.

When such items as a share in the salaries of university personnel are approved, the funds should come to the universities from the Provincial Hospital authority to ensure that salaries and pensions come through one channel.

It is estimated that, if these measures are put into effect, approximately one-quarter of the costs of medical education may be shifted from ordinary revenue of the university.

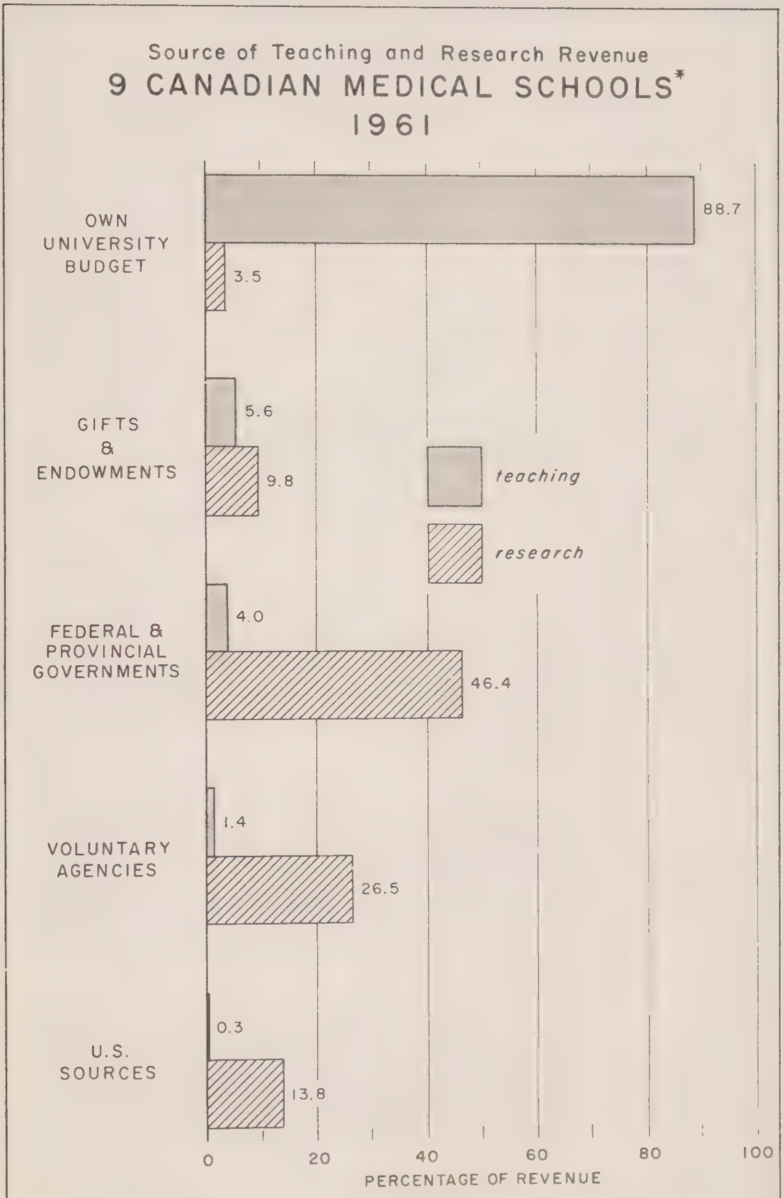
Federal Grants to Faculties of Medicine – It is suggested that, in recognition of the responsibility of the federal government in medical education, a direct grant of 25 per cent of the total of the previous year's costs of maintaining the medical school, excluding research grants, be made to universities which accept the responsibility for medical education.

Fees for Service to Patients – Depending upon the plan for prepaid medical care which may be espoused by the government, a physician who treats a patient may be entitled to certain specified fees for services rendered. When that service is rendered by university-supported physicians to patients in teaching units, such fees should be collectable by the faculty to assist in meeting the costs of medical education and research. Suitable changes in income tax laws may be required before this can occur.

CONCLUSIONS

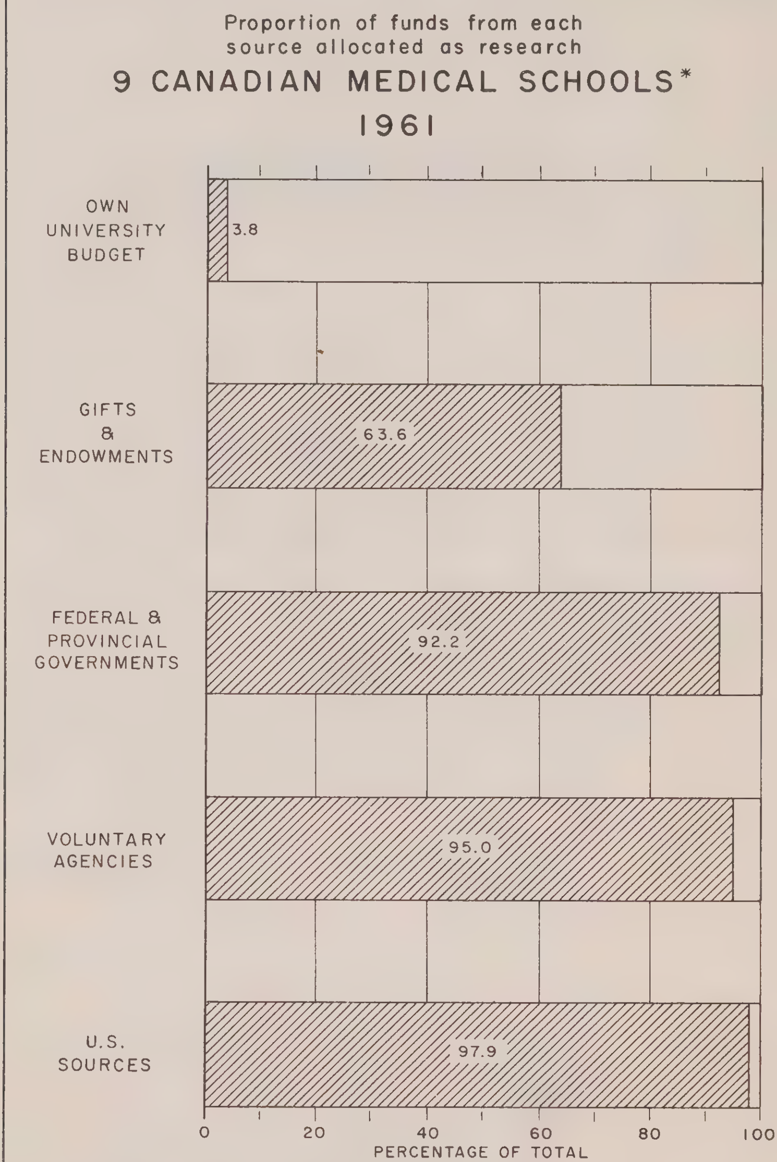
1. The recommendations of the Farquharson Committee concerning the immediate provision of Federal funds to provide more adequate research facilities in Canadian medical schools should be implemented.
2. Fifty per cent of the capital costs of basic medical science buildings should be provided from the Department of National Health and Welfare funds.
3. The construction grants programme from federal sources for hospitals should be modified to provide capital construction grants of 50 per cent of the cost of university operated teaching hospitals or teaching units in general hospitals, to a maximum of 10 beds per member of the graduating year in each medical school in Canada.
4. Universities which have accepted the responsibility for educating physicians should have assistance from federal sources of funds in the provision of the operating budget for medical schools. Such assistance should include:
   a) Up to 50 per cent of the salaries of university employees who devote a proportionate part of their time to hospital functions.
   b) A direct grant to such universities of 25 per cent of the previous year's costs of supporting the medical school, excluding research grants.
5. If a nationally supported plan for prepaid medical care is instituted in Canada, legislation should be enacted which will permit medical schools to collect fees for services rendered to patients by salaried university teachers.
6. If a nationally supported plan for prepaid medical care is instituted in Canada funds should be provided to medical schools to permit the development of expanded programmes of Continuing Medical Education. (See Chapter 9).

FIGURE 7-1



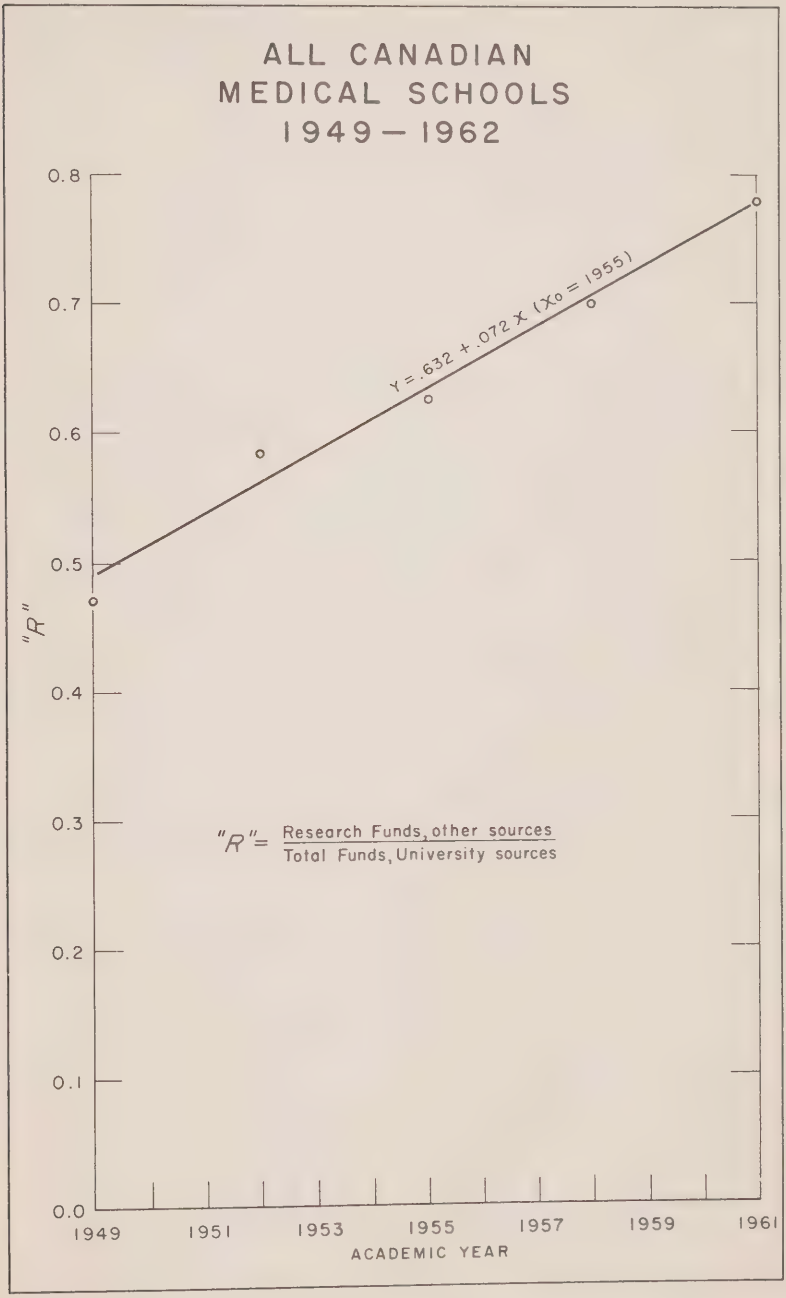
* Ecluding Alberta, Dalhousie and Ottawa for which detailed breakdown is not available.

FIGURE 7-2



* Excluding Alberta, Dalhousie and Ottawa for which detailed breakdown is not available.

FIGURE 7-3


ALL CANADIAN
MEDICAL SCHOOLS
1949 — 1962
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
"R"
Y = .632 + .072 X (Xo = 1955)
"R" = Research Funds, other sources / Total Funds, University sources
1949
1951
1953
1955
1957
1959
1961
ACADEMIC YEAR

CHAPTER 8

THE TRAINING OF TEACHERS AND INVESTIGATORS

A medical school is a fountain of knowledge related to health and disease, serving the public which supports it through the young men and women it trains, and by the contributions to knowledge which arise in its establishments. Its primary duty is to the state, indeed, to mankind; and it cannot exist except by the financial support it receives from the state, and by the voluntary contributions of its citizens. The stream which issues from it is fed from the accumulation of discovery and experience of centuries — stored in its libraries and in the minds of its teachers; its quality is constantly changing as the researches of the scientists within its halls, and in laboratories and hospitals all over the world, add to precision in knowledge. The establishment and maintenance of a medical school is costly, and the public, which must find the funds, have a right to demand that only the most highly qualified and dedicated shall be employed as teachers.

The first teachers that the young medical student meets are those who profess the basic medical sciences, i.e., anatomy, biochemistry, microbiology, pathology, pharmacology and physiology. When medical schools were first established on this continent, local practitioners were drafted to teach, not only clinical medicine, but also what was thought essential in these basic sciences. The emphasis was, of course, on anatomy. As knowledge grew, the practising physician was no longer capable of extemporizing in these fields, which became specialties, taught by men to whose medical training there was added experience in the practical side of the sciences. Divorced from the active practice of medicine, these teachers were employed on a full-time basis; their ardent interest in their specialties led them to investigation; their enthusiasm captured young medical students who asked to work with them, as undergraduates, or as graduates, and even as students in faculties of arts and science, bent on courses leading to the doctorate in science or philosophy. Thus there sprang up schools in which there was a great emphasis on training in research, and in the production of teachers who would occupy the chairs in the medical schools throughout North America — such as Harvard, Johns Hopkins, Yale, Rochester, Chicago, Columbia, Pennsylvania, Washington, McGill, Toronto. Most of the full-time faculty members in the medical schools of the United States and Canada have been trained in one of these schools.

For one who has graduated in medicine and wishes then to be trained in a basic science, the road is long and expensive. It involves attendance at a graduate school, with a minimum period of three years of study for the Ph.D., with coincident and subsequent experience in research under capable direction. The National Institutes of Health (U.S.A.)[1] estimates that the medical graduate requires five to fifteen additional years of training before he is qualified to carry out research at the level of an independent investigator. He has, before entering medical school, spent three to four years in a Liberal Arts College, and likely received his B.A. Should he avoid the four expensive years of medical undergraduate study and proceed to take a Ph.D. in a basic science, he will require five to fifteen years of training after taking the bachelor's degree. Small wonder then, that it is a common practice, particularly in the United States for specialists who have not taken a medical degree to be trained in the basic sciences field. J.C. Hinsey reported (1959)[2] the following data on teachers in the basic sciences in American medical schools. (See Table 8–1).

TABLE 8–1
QUALIFICATIONS OF BASIC SCIENCE TEACHERS
IN 80 AMERICAN MEDICAL SCHOOLS
1952–53

Subject	Degree Held			
	M.D.	Ph.D.	Ph. D. & M.D.	Neither degree
	%	%	%	%
Anatomy	35	47	9	9
Physiology	25	61	11	3
Biochemistry	4	85	7	4
Pharmacology	30	51	17	2
Biophysics	6	47	47	0
Microbiology (estimate)	30	60	7	3
Pathology (estimate)	82	3	15	0

Conditions in Canada are revealed in Table 8–2.

The teachers in the Canadian schools are as well-trained as those in the U.S.A.; the chief difference is in the higher proportion of our teachers who have the M.D. degree. This is particularly noticeable in Table 8–3, which concerns heads of departments only.

[1] U.S. Congress, House Committee on Appropriations, Department of Labour and Health, Education and Welfare Appropriations for 1963, hearings before the Sub-Committee, 87th Congress, Second Session. Report on Manpower for Medical Research, Part 4, pp. 48–49. Prepared by Resources Analysis Section, Office of Program Planning, National Institutes of Health, Washington: U.S. Government Printing Office, 1962, 182 pages.

[2] Hinsey, Joseph C., Proceedings of Second World Conference on Medical Education, New York: World Medical Association, 1959, p. 539.

TABLE 8-2

QUALIFICATIONS OF TEACHERS OF BASIC SCIENCE OF RANK OF ASSISTANT PROFESSOR OR HIGHER IN TWELVE CANADIAN MEDICAL SCHOOLS, 1961-62

Subject	Degree Held			
	M.D. Total	Ph.D. (D.Phil.,D.Sc.) Total	M.D. and Ph. D. Total	No Doctoral degree Total
	%	%	%	%
Anatomy	55	19	21	5
Physiology	45.5	41.5	12	1
Biochemistry	8	83	6.6	2.4
Pharmacology	33	50	12.5	4.5
Microbiology	55	27	12	6
Pathology	74	10	13	3

Source: Supplementary questionnaire to Deans of Medicine by Royal Commission on Health Services.

TABLE 8-3

HEADS OF DEPARTMENTS – ALL CANADIAN MEDICAL SCHOOLS, 1961-62

Subject	Degree Held	
	M.D.	Ph.D., D. Phil. or D.Sc.
	%	%
Anatomy	100	0
Biochemistry	50	50
Microbiology	100	0
Pathology	100	0
Pharmacology	75	25
Physiology	83.4	16.6

Source: Medical School Calendars.

The pattern for the training of a university teacher in Canada in a basic medical science is much as follows. After matriculation, at approximately the age of 17, he may choose to study medicine. He must first take two years of pre-medicine (natural sciences, mathematics, humanities, etc.) or spend three to four years obtaining a degree in a faculty of arts and science; in this he may specialize, e.g., in biochemistry, microbiology, or psychology. His medical training consumes four years, at a high financial cost, and is usually followed by a year of internship, with an income of approximately $2,500. He is now 25 years of age, but is eligible for at least three years of graduate training support as a Research Fellow under the Medical Research Council, or one of the voluntary agencies such as the National Cancer Institute, the Canadian Heart Foundation or the Muscular Dystrophy Association. His stipend will range from $3,000 to $5,000 *per annum.*

He may study in a basic medical science department in a Canadian university (for most Canadian universities now offer good training), or in the U.S.A., Great Britain or Europe. His training is largely in the techniques of research, but he may take a master's degree or a doctorate en route. He is likely to spend at least two years of training abroad, even though he has spent three in Canada. He is now 30 years of age, and ready to seek permanent employment. He may be offered a lectureship in a Canadian university at $7,500, and, if he shows promise of developing into a serious and fruitful investigator, he will be offered a position in an American university at $15,000. Should he choose to stay in Canada, he will gradually climb the academic ladder in the university which employs him and may, within ten years, achieve the income that he could have accepted at the start in the U.S.A. He has, in the meantime, applied for and received research grants from Canadian granting bodies, has attracted a few graduate students, built a reputation as a serious teacher and an effective investigator, and, at the age of 40 has reached the stage described by the National Institutes of Health as having "the capability of carrying out research at the level of an independent investigator".[1]

But, having obtained a bachelor's degree, e.g., in biochemistry, in the faculty of arts and science, he may choose to side-step the four years of medical training and seek a master's degree, and then the doctorate in this field. He is immediately subsidized (at 21 years of age) with scholarships, studentships, and fellowships, at a level which can maintain a single man. He proceeds to a basic science department in a Canadian or American university; he obtains his Ph.D. at the age of 24 or 25 under a discipline which has involved intense training in research. He spends another year or two studying at a foreign university (still liberally supported by fellowships) and, five years younger than his friend who entered the field via the study of medicine, accepts a permanent appointment at the foot of the academic ladder.

The young man who took the medical course is the more liberally trained, his horizon is broader, and he has a greater freedom of choice of a career. He may choose to teach and do research in a clinical field. The period of training is just as long, or even longer, for he must have practical experience in the techniques of his specialty – as well as in research. For this he passes through residency training in hospitals and, finally, promised an academic appointment, may receive a travelling fellowship, under such auspices as the Nuffield Foundation or the R. Samuel McLaughlin Foundation.[2] When he assumes his university post, combining some practice with teaching and research, he may enjoy a larger income than does his basic science colleague.

In 1946, the National Research Council of Canada offered graduate medical research fellowships to Canadian medical graduates; the programme was continued and enlarged over the ensuing years and transferred to the Medical Research

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[1] U.S. Congress, House Committee on Appropriations for 1963, *op, cit.*, p. 47.

[2] Since the inception of its programme in 1951, 246 medical graduates have been awarded travelling fellowships under this Foundation. Of this number, 242 hold appointments as teachers in Canadian medical schools or are presently enjoying their Fellowships and will be appointed to teaching posts on their return from abroad.

Council when it was created in 1961. During the first 10 years that these were available, 164 Fellows were supported by 266 awards. In 1956, 134 of these Fellows had completed their training; of these, 88 had teaching or research appointments and 40 had reached the academic level of assistant professor or higher.

The regulations of the National Research Council permitted the research fellow to spend four hours weekly at teaching, in the institution in which he took his training. A majority of the supervisors encouraged this activity, believing that it is a valuable part of the training, and an experience which would be helpful should the fellow undertake an academic career. A large proportion of the teachers of basic science had their first opportunity to teach during their graduate training periods; many find the need of instruction in the *art* of teaching, and take advantage of courses which are conducted annually under the auspices of the Association of American Medical Colleges.

The long and arduous training of the basic medical scientist makes the career unattractive so long as the financial rewards are low and the conditions of work are undesirable. Salaries in the medical schools of Canada compete unfavourably with the rewards of practice, of industry, and of equivalent opportunities in the U.S.A.

In our basic science departments there are 450 scientists of the rank of assistant professor to full professor. Their origin and country of training are indicated in Table 8–4.

TABLE 8–4

ORIGIN AND COUNTRY OF TRAINING OF BASIC MEDICAL SCIENTISTS IN CANADIAN MEDICAL SCHOOLS, 1961–62

Canadian Born (259)			Foreign Born (191)			
Trained in			Trained in			
Canada	U.S.A.	U.K.	Canada	U.S.A.	U.K.	Elsewhere
223	21	15	48	23	60	60

Source: Supplementary Questionnaire to Deans of Medicine by Royal Commission on Health Services.

Sixty-five per cent of these teachers are native Canadians or have had their academic training in Canada. In earlier years it was the practice of Canadian universities to draw largely upon Great Britain for teachers in the basic sciences. Only 13 per cent of those now employed have come from the United Kingdom. Offerings of these appointments to British scientists are no longer tempting, for salaries and opportunities in the British Isles are equally attractive. Even young Canadians who go to England for graduate training are reluctant to return when they see what is available there.

The deans of the Canadian medical schools reported[1] in 1961, that there were 19 budgeted appointments vacant in the basic medical science departments, and that the average number of students per teacher is 6.5 whereas for satisfactory teaching it should be five. In 1961 the ratio of undergraduate students to teacher in the basic science departments of 86 American medical schools[2] was 3.97. The ratio recommended by a joint committee of the Association of American Medical Colleges, the American Medical Association, and the U.S. Department of Health, Education and Welfare is 3.7.[3] Moreover, the Canadian deans reported, in 1961, that in the basic science departments the available space for teaching and research is from 32 per cent to 43 per cent below the minimum standard recognized in the United States.[4]

It is obvious that if the Canadian schools are to expand, and new schools to be created, we must look to our own graduate schools for staff. But if we are to attract teachers in the basic sciences trained to the level necessary for good teaching, salaries must be increased and additional facilities provided.

CONCLUSIONS

(1) That the present support of graduates proceeding to master's degree and doctorate in basic and pre-clinical science departments now provided by the NRC and MRC be continued and expanded.

(2) That salaries of teachers and research workers in basic science departments be increased.

(3) That the value of research Fellowships provided by NRC and MRC be increased by $1,000; and that stipends for Scholarships and Associateships offered by the MRC be raised to the level which will attract trained scientists to posts in Canadian universities.

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[1] *The Association of Canadian Medical Colleges*, Exhibit A, Appendix A, a submission to the Royal Commission on Health Services, May 1962.

[2] "Medical Schools in the U.S.", *Journal of the American Medical Association*, 178: 632—3 and 647, 11 November, 1961.

[3] *Medical School Facilities — Planning Considerations and Architectural Guide*, U.S. Department of Health, Education and Welfare, Washington: Government Printing Office, 1961.

[4] In the Canadian medical schools, the teachers of basic science have teaching responsibilities to students in faculties of arts and science, as well as in medicine. This greatly increases the ratio of student to teacher, and removes us further from the ideal prescribed in the U.S.A.

CHAPTER 9

POST-GRADUATE AND CONTINUING MEDICAL EDUCATION

POST-GRADUATE MEDICAL EDUCATION

Post-graduate medical education embraces the methods, the facilities, and the opportunities by which a basic doctor[1] may proceed to the status of a general practitioner, a specialist, a research scientist or a teacher.

THE GENERAL PRACTITIONER

The graduate of a medical school (as previously explained) who wishes to practise in any province in Canada, must obtain a licence in that province. The authority to issue the licence is invested in a body, usually known as the College of Physicians and Surgeons, which requires the candidate to pass an examination prescribed by, or acceptable to, the College. Practice under the licence is limited to the province in which it is issued, but a physician may hold a licence in several provinces.

Until 1912, each province conducted its own examinations, but in that year the Medical Council of Canada commenced to hold examinations which have gradually been accepted by all the provinces as a basis for licensure, with one exception. In the Province of Quebec these examinations are recognized for all who graduate outside the province, but graduates of medical schools in the Province of Quebec who wish to be licensed to practise in Quebec must pass examinations set by the provincial licensing body. Since 1950, co-incidental examinations, held jointly by the Dominion Medical Council and the universities have simultaneously satisfied the university for the degree and the provinces for licensure, with the exception of Quebec.

Once licensed, a doctor is legally qualified to provide any known type of medical service. The student in the four years of his undergraduate course can not hope to acquire the knowledge and skill to make use of the increasingly

[1] A basic doctor is a graduate of a medical school who is qualified in the basic and pre-clinical sciences and has attained certain clinical skills. He has the potential for development with further training to be a general practitioner, a specialist, a research worker or a teacher.

complex diagnostic and treatment methods. Yet, today, the only additional training legally required is a one-year general rotation internship, hereinafter referred to as the pre-registration internship.

As the trend toward specialism has developed, the role of the general practitioner has become increasingly difficult, particularly in large centres. Although legally qualified to render any and all medical services, he is not fitted by training to provide many of the more complex procedures. Indeed, most hospitals have restricted the activities of the general practitioner and in some of the larger ones, particularly those affiliated with a university, appointment to the active staff is dependent upon certification as a specialist by some recognized body, and for whose service there is an increasing demand in some areas of the country.

A further problem for the general practitioner is the competition he faces from specialists in the fields of internal medicine, paediatrics, general surgery and obstetrics and gynaecology who provide the service of a personal physician[1] in their specialty.

The concern felt by the general practitioners over their progressive loss of status was one factor which led to the formation of the College of General Practice, which has made a sincere effort to encourage continuing education of its members and has striven to have the role of the general practitioner in hospitals and medical schools given more emphasis. The College has not demanded any period of post-graduate training and has not required its members to sit for any examination. There is no incentive to the man in general practice to take post-graduate training comparable to that existing for specialists. Hence, many of the senior internships offered for those planning to go into general practice are unfilled each year.

McKeown advocates the replacement of the general practitioner by four categories of physicians each serving an age group (obstetrician, paediatrician, general physician, geriotrician). Whether such rigid subdivision is desirable in any country is open to debate, but as applied to Canada with its many small communities, it is quite impractical in the foreseeable future.

Others suggest that the general practitioner should become a "sign post" to direct patients to the proper specialist. Such a plan would further detract from his prestige and from the interest of his work. For the same reason, this plan does not seem adaptable to the needs of Canada.

It is apparent that the role of the general practitioner must change, for it is beyond the ability of anyone to be competent in all fields of medicine. Since neither of these schemes of replacement provides the solution for the Canadian pattern, the role and the training of the general practitioner must be otherwise altered if he is to become a more effective member of the team providing health services.

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[1] A personal physician, whether specialist or general practitioner, is one who provides his services directly at the call of the patient, as distinguished from the consultant whose services are only provided at the request of the personal physician.

A solution to the problem might be the development of a new type of family physician trained in those aspects of medicine which would prepare him best for his role of looking after the needs of the whole family, with help from consultant specialists when required. Since it is widely believed that the more complex diagnostic procedures and surgery, except for minor emergency operations, are best performed by specialists, it would follow that the training of the family physician should emphasize medicine, paediatrics, psychiatry and obstetrics. This would be facilitated by greater flexibility in the pre-registration internship.

There is an increasing tendency for two or more general practitioners to have common office accommodation with receptionist, nurse, and cleaning personnel serving the group. This sharing of practice provides attractive offices, and the opportunity for the rotation of night and weekend calls among the members of the group leads to less fatigue and consequently to better performance. The formation of such groups is to be commended and encouraged.

THE PERSONAL PHYSICIAN

There is an increasing demand for a personal physician with greater training than that of the family doctor, and a tendency to employ specialists trained in medicine, general surgery, paediatrics, or obstetrics and gynaecology. Yet such specialists lack the broad training required to provide the best care to the whole family. Two years of resident training in medicine, obstetrics, paediatrics and psychiatry would produce a doctor capable of dealing with the diagnostic and therapeutic problems which do not require highly specialized diagnostic procedures or surgical treatment. As a personal physician with special training, he could offer better service to a family than can the man more highly trained in a narrow specialty, who would accordingly tend to confine his work to a consulting practice.

An alternative training for the personal physician might be two years of supervised practice with a group, followed by one year of resident training. Such a plan would also promote the development of group practice. After either form of training, a suitable examination leading to a distinction such as a certificate or fellowship would be necessary to lend status to the new specialty.

Men trained in the specialty of personal physicians might later decide to specialize in a single field. They would be encouraged to do so if their earlier training were recognized as part of that necessary to entitle them to sit the examinations for Certification or Fellowship of the Royal College of Physicians and Surgeons of Canada.

THE CONSULTANT SPECIALIST

The use of the term "specialist" by the medical profession began in the late 19th century. Although physicians and surgeons in ancient times developed along different lines, organized medical education came to include training in

both categories and most graduates practised in both these broad fields. Nevertheless, some, by virtue of their special skills or interests, tended to concentrate on either the operative or non-operative field, achieving their unique knowledge and skill through years of experience, or through study under teachers of acknowledged stature. These were well recognized by their colleagues as experts in their field and worthy of the designation of specialist.

The prestige of the specialist led to spurious claims. A man would leave his community and, after a period sometimes as short as a few weeks at some distant medical centre, return and announce himself as a specialist. The inadequate training of such men in no way justified their assumption of the role of specialist and, quite understandably, they aroused the indignation of their colleagues, as is demonstrated by a resolution adopted by the General Council of the Canadian Medical Association at its 14th Annual Meeting held in Halifax, Nova Scotia, in 1881.

> "A Resolution for the Discountenancing of Specialism
>
> "Whereas the system of specialism and specialists which at present obtains to a certain extent in the Dominion and which has developed to a very large proportion in the neighbouring Republic, is for the most part the outgrowth of superficial professional education and a want of success as practitioners of medicine and surgery; therefore be it resolved:
>
> "That it is the opinion of this Society that specialism should be discountenanced by the members of the Society, and that specialists, except in the rare cases where long experience, extended study and peculiar aptitude have placed a medical man in a special position towards his brethren, should be treated and looked upon as irregular practitioners."[1]

Notwithstanding this action by the Canadian Medical Association, the increasing volume of medical knowledge made the development of specialism inevitable. In 1881, departments of gynaecology and of ophthalmology and otology were established at McGill University. Since then, more and more specialties have been recognized by the universities and in the practice of medicine. There came to be evident need for some means of determining who were qualified to be considered as specialists.

In 1926 the first restrictive action was taken when the Medical Profession Act of Alberta was amended to make it illegal for any physician to classify himself as a specialist unless he possessed a certificate from the Registrar of the University of Alberta indicating that he had complied with the conditions prescribed by the General Faculty Council of the University.

Apart from this excellent effort by the Province of Alberta, no further progress was made until the founding of the Royal College of Physicians and Surgeons of Canada in 1929. The development of the Fellowship Program of the Royal College, of its Certification Program and of its Program of Approval of Hospitals for Specialist Training is well documented by Dr. Sclater Lewis.[2]

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[1] MacDermot, H. E., M.D., F.R.C.P. (C), History of the Canadian Medical Association, Toronto, 1935, p. 67.

[2] Lewis, Sclater, *The Royal College of Physicians and Surgeons of Canada*, Montreal: McGill University Press, 1962.

The Specialist Certificate of the College confers no legal rights upon its holder, such being the prerogative of the provincial licensing bodies. Nevertheless, the esteem in which the Royal College certificate is held, is indicated by the fact that in British Columbia, Saskatchewan and Ontario it is the only proof of special training that is recognized by the Provincial Colleges of Physicians and Surgeons. In Alberta, although the certificate is accepted, the Provincial College reserves the right to refuse admission to the Register of Specialists and the alternative method of certification previously described still is in effect, though used very little. In Manitoba, Royal College certificates are required but the province reserves the right to recognize other degrees or diplomas in special circumstances. In New Brunswick, since 1960, the Royal College Certificate has been required for entry on the Provincial Register's List of Specialists. In Nova Scotia, Prince Edward Island and Newfoundland there is no official register of specialists. The Province of Quebec has conducted its own specialist examinations since 1956.

The role of the specialist is controversial. Some believe that he should limit his work to consulting practice and thus see patients only on referral by another doctor – usually a general practitioner. Others consider that his role includes the provision of personal physician services in his specialty to any who elect to consult him. For instance, in the fields of ophthalmology, otolaryngology and obstetrics the need for referral is, to say the least, obscure. One may question whether the employment of an obstetrician through reference only can provide the best care for the most people at a reasonable cost. Many specialist internists, paediatricians and general surgeons provide personal physician services, sometimes combined with consulting practice. Obviously, plans for the provision of specialists must be dependent on the role they are expected to play.

The degree to which specialist training is increasing is indicated by comparison of the number graduating from Canadian medical schools with the number sitting the examinations of the Royal College of Physicians and Surgeons of Canada and the number of those who are successful, as shown in the following tabulation.

In the period 1945–1960 a total of 12,466 students have graduated from Canadian medical schools. In the same period, 6,163 have passed the certification and fellowship examinations of the Royal College. This number is not an accurate indication of the number of specialists since not a few, having passed the certification examinations, subsequently qualified for the fellowship. The actual number trained in the period was 7,882. The number of new specialists who qualified in 1961 was 553. In 1945 the ratio of new specialists to new graduates was 23 : 769. In 1961 it was 553 : 834. Both totals include graduates from other countries; in 1961 there were 388 Canadians certificated, and 773 graduated from medical school.

Despite this enormous increase in specialism the recent survey of specialist requirements conducted by the Royal College of Physicians and Surgeons

Graduated from Canadian medical schools		Sat examinations		Successful	
		Fellowship	Certification	Fellowship	Certification
1945	769	36	–	23	–
1946	513	74	57	42	36
1947	567	129	166	80	135
1948	632	138	207	75	160
1949	679	158	282	98	211
1950	791	176	383	88	313
1951	858	212	365	115	295
1952	783	208	335	112	284
1953	825	223	364	95	297
1954	896	276	451	114	355
1955	894	293	475	135	351
1956	816	347	534	130	368
1957	893	423	665	134	397
1958	828	350	633	149	458
1959	859	398	662	161	414
1960	863	459	621	174	364

of Canada indicated shortages in certain specialties. These shortages are open to further study.

1. Anaesthesia – The four years of training following junior internship required by the College for fellowship or certification is reasonable for anaesthetists who are to be employed as teachers and heads of departments of anaesthesia in teaching hospitals and some large non-teaching hospitals. It is unreasonable to expect that all anaesthetists in Canada require this training. Other courses of training have already been instituted to fill the gap and more will undoubtedly follow.

2. Bacteriology – The status enjoyed by the medically qualified bacteriologist has been in most instances lower than that of his medical specialist colleagues. In most universities and hospitals he has worked as head of a branch of the department of pathology. The low remuneration, too, has discouraged many from entering this specialty. While it is necessary and, indeed, desirable to fill many posts in hospitals with non-medical bacteriologists, it is equally desirable that teachers and the heads of departments of bacteriology in the chief university-affiliated teaching hospitals be medical graduates with broad training in bacteriology such as is now required by the Royal College for certification or fellowship in this specialty.

3. Pathology – A shortage of pathologists available for services in hospitals is not due to poor remuneration. In the research and teaching fields this may be a factor, but probably it is less important than other causes difficult of definition but linked with the broad training now taken in other specialties, which has led to a decrease in the prestige previously enjoyed by the pathologist.

A lack of imagination in developing the teaching of this subject and a tendency to rigid adherence to traditional methods has resulted in a failure of this specialty to attract young men to the same degree as have some other specialties.

4. Physical Medicine and Rehabilitation – This is a relatively new specialty with an expanding demand on the part of the profession which, with the increasing scope and challenge of its opportunities, should result in increasing numbers being attracted to it.

5. Diagnostic Radiology – New techniques, expansion of prepaid medical plans, hospital insurance, and greater knowledge by practitioners of the value of radiological examination have all led to increased demand. In this specialty, remuneration is adequate. In many field such as orthopaedic surgery, genito-urinary surgery, cardiovascular disease, chest disease, – in fact, any field in which fluoroscopy is not part of the examination and even in some where it is – specialists in the given fields are in the habit of reading the X-ray plates of their patients and ignoring the interpretation of the radiologist. It is difficult to see how this problem can be resolved. One possible answer is the evolution of radiological specialists in various fields where knowledge and skill will command increased respect.

6. Therapeutic Radiology – The introduction of the cobalt bomb and the diagnostic and therapeutic use of radio-isotopes have increased the load on this expanding specialty.

7. Ophthalmology – The shortage in this field exists in spite of the fact that much of the refraction is done by optometrists who work entirely independently of the ophthalmologist (oculist) and, with rare exceptions, resent any suggestion that they should work under the guidance of the ophthalmologist. Much of the time of the highly trained ophthalmologist is taken up with refraction. He could work more efficiently if he were provided with ancillary personnel such as refractionists and orthoptic technicians who would work under his direction and free him for the performance of the highly skilled procedures acquired in his long training.

8. Otolaryngology – The limited attraction of this field is due to encroachment by neurosurgery, by the performance of bronchoscopy and oesophagoscopy by physicians and surgeons, by dentistry and plastic surgery, together with the reduction in operative work consequent upon antibiotic therapy. There is a possibility that this specialty will disappear or be incorporated into general surgery.

9. Obstetrics and Gynaecology – The demand of the public for personal physician care in this field has reduced the attraction to this specialty. The development of personal physicians will reduce the need for many highly trained specialists in obstetrics and gynaecology. Such specialists will consequently practise as consultants.

10. Paediatrics – The great majority of paediatricians are providing their services directly at the call of the family and so are practising in the

category of personal physicians to the under-sixteen age group. The development of personal physicians would greatly reduce the required number of specialist paediatricians and would permit those so trained to serve as consultants.

11. Psychiatry – The development of personal physicians would reduce the load on the specialist psychiatrist and permit him to confine his activities to consultant practice.

Although there are no shortages in the specialties of internal medicine and general surgery, some comment is appropriate. Many specialist physicians and specialist general surgeons are today providing a high quality of personal physician service. It could be expected that the development of the personal physician – with a sound basic training in internal medicine, paediatrics, obstetrics and psychiatry, but without training in surgery – would permit the specialist surgeons and physicians to function as consultants exclusively and so reduce the number required.

The requirements for training of specialists as outlined by the Royal College of Physicians and Surgeons of Canada are contained in handbooks available from the College headquarters in Ottawa. They are subject to constant review by the Credentials Committee of the College on the advice of its Specialty Committee and of the National Specialty Societies in Canada.

At this stage of development a certain degree of rigidity has perhaps inevitably crept into the regulations which could be made more flexible without lowering the standard of training demanded. It must be clearly recognized that the great strength of the Royal College of Physicians and Surgeons of Canada lies in the calibre of the training which its Fellows and Certificants have received rather than the examination they have passed.

THE CLINICAL RESEARCH SCIENTIST

Clinical research is in an early stage of evolution. Until World War II medical research was undertaken mainly by those trained in the basic and pre-clinical sciences. The few clinicians who were active in research had had training in one or more of the basic sciences. For the most part they worked apart from clinicians and communication between the two groups left much to be desired.

A few of these clinical investigators chose to work with the practising clinicians in the teaching units of the teaching hospitals. They immediately attracted to them young men interested in research, with a view to continuing in a research career or as part of their training for specialist practice. There thus arose two problems for the teaching hospitals to solve, the provision of space and equipment to permit these men to develop their talents, and financial support for the directors of these units and for those who work under them.

Clinical investigation units in some of the university affiliated teaching hospitals now provide the facilities for clinical research. The heavy cost of

building and maintenance is divided between university and hospital, and continued operation depends on the receipt of grants for research. As these units contribute both directly and indirectly to patient care in the hospital, it is reasonable to expect that some support for their operation should come from the federally supported hospital insurance plans of the provinces. If the salaries of the director, the nursing and dietary staff, the laboratory technicians and other ancillary personnel were considered a responsibility of hospital insurance, operation of the units would be much more fruitful. Special grants from the federal and provincial governments to provide space in teaching hospitals would encourage this essential means of improving the standards of health care.

The first clinical investigation units developed were concerned largely with biochemical balance and endocrine studies, and we have been slow in escaping from this stereotype. However, similar units are required in other fields such as cardiovascular disease, pulmonary disease, gastrointestinal disease, haematological disease and neurological disease. The Association of Canadian Medical Colleges has defined a clinical investigation unit as follows:[1]

"A Clinical Investigation Unit consists of two parts:

(1) A separate area consisting of a designated number of beds with special kitchen, dietetic and other facilities when appropriate.

(2) Adequate laboratory space close to the Unit's bed space, containing basic equipment related to research work carried out.

"The permanent personnel would consist of technical dietetic and essential nursing staff under the direction of a competent clinical investigator."

Young men who are attracted to a career in clinical investigation ask: What special graduate training should they undertake, apart from a good clinical experience; how will they be supported during their training?

In some instances a Ph.D. in a basic science is a good preparation. The training leading to the Fellowship in the Royal College gives little time for experimental work. The programme recently offered by the University of Toronto, leading to the degree, Doctor of Clinical Science, will probably be very useful; it would be well to have the universities undertake a greater interest in graduate training and clinical research and offer appropriate recognition.

Assistance for graduate training in medical research is offered by the Medical Research Council, the Queen Elizabeth II Fund, and by a group of voluntary agencies and foundations listed in Table 10–4 of Chapter 10.

There remains the consideration of the support of training of medical graduates in research in clinical investigation units. At present their main source of support is the M.R.C. It was natural that the Medical Division of the

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[1] Annual Meeting, A.C.M.C., 1961.

N.R.C. (predecessor of the M.R.C.) should have been composed mainly of basic scientists, since nearly all medical research, at the time of its inception, was conducted in such departments. The development and expansion of research in the various clinical departments now makes advisable an expansion and broadening of the M.R.C. to include among its members more skilled investigators in the clinical fields. It also justifies the financial support of young men who wish to spend one or more years in clinical investigation units, in the over-all plan of medical education. Where they cannot be supported through research fellowships and from research grants, and where their work is such that the service supplied to patients does not warrant their inclusion in the resident staff of the hospital, training grants from federal and provincial sources should be provided. This would correct a current practice in which a somewhat unsatisfactory training in research is offered through the generosity of hospitals and hospital insurance plans in supporting a supply of residents beyond legitimate service needs.

It is likely and desirable that an increasing number of young men will spend a year or more in such units during the course of their specialty training. Nevertheless, it should not be equated with training in research methods in a basic science department as a background for a clinical research scientist. Selected students might be encouraged to interrupt their undergraduate course in order to spend a year or more in a basic science department. It should be possible to work out a suitable programme to provide the requirements for a B.Sc. degree. Alternatively it should be possible to achieve the same end by spreading the work over two or three summers. But training in clinical investigation should follow graduation in medicine.

THE CLINICAL TEACHER

The development of a clinical teacher cannot be readily reduced to a formula, nor would it be desirable even if it were possible. Some believe that any good doctor can teach – a fallacy all too evident to any undergraduate medical student today. Teachers, with rare exceptions, reflect the influence of their schools. The graduate of a German medical school is likely to look upon the "big lecture" as the teaching method of choice. In Canada the laboratory in the basic sciences and bedside teaching in the clinical field are deemed of much greater importance. In the United States great emphasis is being placed upon the value of providing the undergraduate student with research experience. It is likely that while among any group of Canadian teachers one could find differences of opinion, the majority would favour a reduction in didactic teaching and an increase in methods which encourage the learning habits of the students.

In the clinical fields most teachers will be required to achieve the Fellowship in the Royal College, and will have acquired particular knowledge in the narrow field of a specialty. A majority will have had some training in research methods, in either a basic science department or a clinical investigation unit. They will have spent four to six years in training after

the pre-registration junior internship. They must be strongly motivated toward a teaching career, looking upon it as a means of making a contribution to society, since their financial reward will be much less than that of their colleagues who spend all their time in specialist practice. It is important to insure that the ambition to teach is not discouraged by eventual low income.

The provision of the salaries of full-time teachers falls on the universities. A teacher in a clinical field may be head of the corresponding department in a teaching hospital. It is difficult to determine what proportion of such a teacher's time is spent in teaching, patient care, university administration, hospital administration, and in work related to other community activities which his position demands. Pending studies of this problem, the principle may be advanced that some of the financial support of such hospital department heads and other full-time medical personnel in clinical departments should be borne by the hospital insurance plans. This principle becomes increasingly important if plans to continue teaching throughout 11 months of the year in the third and fourth years come into effect.

Although the numbers of full-time teachers in the clinical departments are steadily increasing, dependence on part-time teachers for a very considerable proportion of the supervision of students is still prevalent. These men provide their services for remuneration which in most instances is nominal. The link provided by the part-time teacher with the profession at large is valuable and will become even more valuable should all people be covered by health insurance. The contribution of these men should be recognized by more suitable remuneration. Their contribution to the care of the sick in teaching units justifies a charge for part of their earnings upon hospital insurance plans.

CONTINUING MEDICAL EDUCATION

Robert Oppenheimer has stated that research doubles the fund of scientific knowledge every ten years and that the past 50 years have provided greater advance than the whole preceding period of recorded history. The increase in medical knowledge has kept pace with that in other branches of science. It is evident then, that even if the student could accomplish the impossible and assimilate the total fund of available knowledge in the four years at medical school he would rapidly be out of date unless he continued to study and keep abreast of new developments.

Continuing medical education is designed to assist the practising doctor to be aware of the rapid developments of medical knowledge and to refresh his memory of basic medical principles. The universities and the medical profession have taken the lead in developing a programme of continuing education which is, as yet, woefully inadequate. It is in the public interest that this programme be expanded as rapidly as possible.

For many years the universities have provided speakers to address medical societies in their own and, less commonly, beyond their own constituencies.

Until the end of World War II this activity, started by the medical societies but mostly supported by university teachers (usually without remuneration), has provided the only form of continuing medical education available in Canada, apart from the Dalhousie Refresher Course held annually since 1926. The reluctance of universities to place a further burden of teaching on the staff of the clinical departments, composed almost entirely of part-time teachers, was understandable for they were already providing, with ridiculously meagre remuneration, the bulk of the teaching in the clinical fields.

In 1929, the Sun Life Assurance Company of Canada made a grant of $30,000 to the Canadian Medical Association for the purpose of furthering post-graduate medical education. This grant was renewed annually until 1938. The money used was expended by the Canadian Medical Association through its Provincial Divisions, largely by providing teams of speakers to visit branch societies. When the grant terminated in 1938, the C.M.A. continued to support the Divisions by a grant of $500 to each province plus one dollar for every active member of the Division. This amounts to about $16,000 annually.

After World War II the needs of returning veterans for refresher courses, the increased demands of the medical societies and the development of the programmes of Fellowship and Certification of the Royal College, led to increased activity by the universities in the field of continuing education, particularly at Toronto and Dalhousie and, more recently, at the University of British Columbia. Reports of these programmes are included as Appendix 5. The University of Alberta established a post-graduate division in 1963.

PROGRAMMES OFFERED TO THE GENERAL PRACTITIONER

Wherever developed, programmes of continuing medical education have taken the form of combinations of the following activities:

1. Addresses at local medical societies
2. General refresher courses for general practitioners sponsored by:
    a) University
    b) Other – e.g., – College of General Practice
    Canadian Medical Association
    Provincial Medical Societies
    Local Medical Societies
3. Specialized refresher courses (universities or teaching hospitals)
4. Individual courses – specially arranged (universities or teaching hospitals)
5. Regional clinical programmes (hospital-based) (universities).

Notwithstanding the variability of the sponsoring body the load of teaching has been borne almost entirely by university teachers.

The provision of speakers to local medical societies has often proven unrewarding. The speaker arrives for the meeting, sits through a long business meeting which wearies him and his prospective audience, then addresses a

lethargic group, answers a few questions (if he is lucky), and departs for home feeling, as a rule, that he has contributed nothing to the improvement of the medical care of people in that community.

Refresher courses for general practitioners as exemplified by the Dalhousie Refresher Course, the Medical Alumni Course of the University of Toronto, and similar courses at the University of British Columbia provide, for the most part, didactic teaching for periods of one day to one week. They attract varying numbers of practitioners who attend with variable regularity. Among them is a hard core of very good practitioners – usually members of the College of General Practice – who attend year after year. The discouraging feature of these programmes is the fact that they reach only a small portion of the medical community. This may be explained in part by the difficulty a family physician has in leaving his practice for a period of days, and in part by the fact that didactic teaching cannot continue to prove attractive to most practitioners.

Programmes attractive to the general practitioners are offered at the Annual Meeting of the College of General Practice, Regional Meetings of the College of General Practice, Annual Meetings of Provincial Medical Societies and, to an increasing degree, at the Annual Meeting of the Canadian Medical Association. The speakers are usually provided by the teaching staffs of the universities.

In some instances where the university has not taken the lead in post-graduate education, the affiliated hospitals have arranged refresher courses of high standard. The teachers in such cases are drawn almost entirely from the university staff and one may question the advisability of the university holding aloof, and so sacrificing its ability to control the teaching load of its staff members.

The fact that attendance continues to be maintained or even improved at such meetings in the past few years may be attributed in part to the demand of the College of General Practice, that its members undertake a certain number of hours of continuing education each year.

Specialized refresher courses are exemplified by a course in "Auscultation of the Heart" provided by Dalhousie University lasting for four evenings at weekly intervals, or by courses lasting a few days a week in various specialties, provided each year by the University of Toronto and by Dalhousie University. Individual courses provide little toward the main problem of continuing education but do provide an opportunity for the occasional doctor, be he family doctor or specialist, to spend some time in the day-to-day activities of a university teaching centre, in the particular field in which he has a special interest.

Regional Clinical Programmes started by the University of Toronto in 1951, by Dalhousie in 1954, and by the University of British Columbia in 1962, have proven most rewarding to both the contributing doctors and those attending. They are based in local hospitals by arrangement with the local Medical Society. They consist in the presentation of cases by members of the hospital staff and

a discussion of the problems provided led by a visitor. Such a programme emphasizes the way doctors learn most from their problem cases, and brings to the small community hospital an extension of the teaching ward round of the teaching hospital. It demands a real contribution from the local doctor, and in the opinions of Dr. Donald H. Williams of the University of British Columbia, Dr. R. Ian Macdonald of the University of Toronto and Dr. Lee C. Steeves of Dalhousie University, has proven to be the most effective form of continuing education yet developed for the general practitioner.

So successful has it become that those who direct post-graduate programmes place increasing emphasis upon it. At Dalhousie, other forms of continuing education are being reduced in order to permit expansion of the Regional Clinical Programme.

The start that has been made in this field by the three universities has revealed the major difficulty in expanding it: the cost in money and in teaching time. Steeves[1] has estimated that to provide the minimum requirements of the College of General Practice of 100 hours every two years to the doctors of the Atlantic Provinces would require the equivalent of the services of nine full-time teachers and would cost a minimum of $250,000 per year.

Williams,[2] in a communication to the Commission, suggests "that the federal government should require as a condition for financial assistance for medical care to a province that an approved programme of continuing medical education for physicians be put in operation in the province receiving the grant, and the government shall make provision for the establishment of standards for programme approval and for periodic programme evaluation and accreditation thereafter." He believes that continuing medical education would be strengthened by "a statement by Canadian universities and Faculties of Medicine of their philosophy and objectives, including support of the concept of life-long learning as an inherent characteristic of a career in the practice of medicine."

The cost of providing the programme of continuing education is quite beyond the resources of present university budgets. It has been argued that the doctors who are to benefit from the programme should pay for it, but there can be no doubt that it is in the interests of the people that their doctors be kept abreast of medical advance. Experience has shown that if courses are to be brought to a large proportion of the doctors in the country, funds exceeding those provided by registration fees and donations from medical societies will be required. (See appendix – Dalhousie) Should medical care insurance be introduced it would be appropriate that it should contribute to the support of the extramural regional programmes of continuing medical education.

The inadequacy of the continuing medical education programme has provided the drug companies in the United States and Canada the opportunity to develop a new means of promoting the sale of their products by "educating"

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[1] Steeves, L.C., *Canadian Medical Association Journal,* 88:732, 1963.

[2] Williams, Donald H., University of British Columbia.

the physicians. May[1] has estimated that $750,000,000 was expended by drug companies in the United States in 1959 in promotional activities. Through advertising in medical journals and direct mail to physicians $125,000,000 was spent. The maintainance of detail men, exhibits, films, trade publications, lectures, televised clinics, samples, etc, accounted for most of the balance. This huge expenditure directed to "educating" the physician to using the drug companies products has, through default, taken the place of a proper programme of continuing education. The expenditure in drug promotion in Canada if taken at the usual 10 per cent of that in the United States would mean an expenditure in 1959 of $75,000,000 – more than the combined budgets and research expenditures of all the medical schools of Canada. The expenditure of a much smaller sum would provide a proper continuing education programme based on the universities.

If public funds are to be spent on the education of doctors at both the undergraduate and post-graduate levels, in amounts exceeding those devoted to other professions, the public may well demand assurance that this money is well spent. Clute, in his recently published book "The General Practitioner"[2] has indicated that in some instances, the performance of the general practitioner is below the arbitrary standard selected.

The interesting study that made the writing of this book possible was initiated by the College of General Practice of Canada and surely represents a unique example of a profession conducting a critical survey of its own performance. Methods for the study of performance in hospital are provided by such measures as the Medical Audit, the Professional Activities Study, and (in Ontario) the Hospital Medical Records Institute. Studies of the accounts submitted by doctors to prepaid medical plans are giving unexpected information in regard to the performance of the profession. While by these and other means we may be able to assess the performance of a doctor, there remains the problem of what should be done with the practitioner whose performance is substandard.

There is long-standing precedent for the punishment of the erring physician. The Code of Hammurabi,[3] the oldest known code of law dating about 2270 B.C., and reflecting the views of the most advanced civilization of the day – the Assyrian – states in article 218, "If a physician treats a man for a severe wound with a bronze knife and kill him, or if he open an abscess (near the eye) and destroy the eye, one shall cut off his hands".

It might be proposed that, periodically, the doctor's licence be revoked or suspended until he had satisfied some duly appointed body that he had suitable further training. This would be difficult to enforce and would deprive the community of the doctor's services for a considerable period. History provides little evidence to support the view that punitive measures have resulted in

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[1] May, Charles D., *Journal of Medical Education;* 1961:36:3.

[2] Clute, Kenneth, *op. cit.*

[3] Code of Hammurabi, as quoted by Albert Kocourek and John H. Wigmore, Sources of Ancient Primitive Law, *The Evolution of Law,* Vol. 1, Boston: Little, Brown & Co., 1915.

improvement in the standard of medical care. How much better it would be to forestall the necessity for this by demanding attendance of all doctors at suitable post-graduate activities from the day of graduation – prevention rather than sanctions.[1]

CONTINUING EDUCATION OF THE SPECIALIST

The continuing education of the specialist provides only one real problem at present. Through the meetings of Specialist Societies, Provincial, National and International Organisations, and the increasing activity of the Royal College, opportunity has been provided for free interchange of ideas hampered only by the cost of attending such meetings. Permission to deduct the cost of attendance for income tax purposes at more than the two meetings now allowed would do much to foster attendance at these meetings.

CONCLUSIONS

1. That, in the interest of the training of the graduate for family practice, the regulations governing the pre-registration internship be modified so as to permit greater flexibility.
2. That the College of General Practice, in consultation with the Association of Canadian Medical Colleges and the Royal College of Physicians and Surgeons of Canada, consider the development of a programme of training and suitable examinations for specialist personal physicians.
3. That the Association of Canadian Medical Colleges be requested to develop courses in anaesthesia of about two years' duration to provide the skilled anaesthetists required by the country.
4. That the need for medically qualified bacteriologists in key teaching and hospital posts be recognized by provision of attractive remuneration.
5. That the present system of training of specialists as developed by the Royal College of Physicians and Surgeons of Canada be continued with modification from time to time as need arises.
6. That greater flexibility in the requirements for training in the various specialties be permitted where it can be achieved without sacrifice of quality.
7. That federal-provincial grants be provided for construction of clinical investigation units in the university affiliated teaching hospitals.
8. That clinical investigation units in university affiliated teaching hospitals be supported in part by funds derived from the federally supported provincial Hospital Insurance Plans.
9. That the Medical Research Council consider increasing the proportion of clinical investigators in its membership.

[1] This subject is further discussed in Chapter 15.

10. That the terms of the training grant programme of the Department of National Health and Welfare be broadened to include support for training in fields not properly covered by Resident Training Programmes and Research Fellowships.

11. That a portion of the salaries for full-time teachers in clinical departments who hold appointments in the affiliated teaching hospitals be provided by the federally supported provincial hospital insurance plans.

12. That the valuable contribution of the part-time teacher in the clinical departments be recognized by a more realistic scale of remuneration.

13. The group feels very strongly that the medical schools which now have programmes of post-graduate medical education should be encouraged to expand them, and that all the other medical schools should be encouraged to establish divisions of post-graduate medical education as early as possible. The efforts of each school in this field should be correlated under a director, who in the early stages of the programme might be on a part-time basis. In the future, certainly in the larger schools, he must work on a full-time basis.

14. In general we believe financing should be on a three-way basis. The doctor who enrols in the course provided should pay half the costs. The remaining half should be shared by the Federal and Provincial Governments. We think that if medical care insurance is introduced that this is a reasonable charge against the insurance funds.

15. The cost of attending university-sponsored continuing education activities should be regarded as deductable expense for income tax purposes.

16. Part-time clinical teachers in medical schools should be allowed to deduct for income tax purposes the cost of attending four medical meetings per year.

CHAPTER 10

RESEARCH

EARLY ACHIEVEMENT

Henry Sigerist, the medical historian, has written that in every country which has been opened to Western civilization, we can distinguish three successive stages in relation to medicine. In the first, the population is treated by physicians who have been trained in other countries. In the second, medical schools have been established so that training is available in medicine, with teachers who have little time for research and who have probably been trained abroad. In the third stage, research has been introduced and is being pursued with growing intensity by foreign scientists and their graduate students. We had reached the threshold of this third phase when Banting went from London to the University of Toronto to ask that he might work on a problem related to diabetes. MacLeod was there, and had with him Best, and Collip on leave from Alberta. Frederick Miller, after training with Sherrington, was established in the University of Western Ontario and active in his researches on the central nervous system. John Tait had come to McGill from Edinburgh and was teaching McNally, who later became an authority in otolaryngology. Presently Collip and Babkin moved to McGill and trained John Browne and Arthur Vineberg; Penfield came from the U.S.A. to develop and illuminate the Montreal Neurological Institute. Masson moved from Strasbourg to the University of Montreal to teach pathology; his graduate students included L.C. Simard and G.L. Riopelle.

Insulin was discovered. Canadians developed an enthusiasm for research. The public became interested in the support of Banting's work. The Department of Medical Research was established in the University of Toronto with Dr. Banting as Professor. The Ontario Government provided an annual grant for the maintenance of his work. A group of businessmen in Toronto collected money to establish the Banting Research Foundation. Part of the income was to support Banting's researches and part was available for grants to other young men in Canada who might wish to do research in medicine. The Federal Government gave Banting an annuity. He became sufficiently independant that he could reject the flattering offers which were made to him to go to the United States. His great passion was to encourage young men to engage in research in medicine. He became more important as a catalyst than as a discoverer. In 1935 he was invited to become a member of the National Research Council. He agreed to accept the

position, provided the Council would support research in medicine. The Council created the Associate Committee on Medical Research in 1938 and made Banting its Chairman. Its first budget was $53,000. Banting became aware of impending war, and was instrumental in developing, under the National Research Council, an Associate Committee on Aviation Medical Research. This Committee became active with the outbreak of war. In 1941 Banting was killed on a flight to Britain. He was succeeded as Chairman of the main Associate Committee by J. B. Collip, and as Chairman of the Aviation Committee by Duncan Graham. A year later, at the First Banting Memorial Lecture, C. J. Mackenzie, the President of the National Research Council, said:

> "When the final accounting is made I feel sure he will have at least three great contributions to his credit. To the multitude his name will, of course, suggest insulin. To the better informed it may well be that the impetus his work gave to medical research activity in this country, and later his work in organizing the medical research laboratories and workers co-operatively in Canada will appear to be of even greater and more enduring importance."

When World War II was over, the National Research Council replaced the various Associate Medical Committees with a Division of Medical Research under the chairmanship of J.B. Collip. Its first budget, in 1946, was $200,000. It offered grants for assistance in research, and, for the first time, graduate medical research fellowships for training. The Department of National Defence maintained its interest in scientific research (including medicine) by establishing the Defence Research Board, and the Department of Veterans Affairs budgeted for research in medicine in its own installations.

In 1948 the Prime Minister announced the institution of National Health Grants and of a health research programme. The Health Grants were designed primarily to assist the provinces in maintaining their health services, but a province was at liberty to use a portion of a Health Grant for research in a particular field. This was a wise provision, for it had three good effects. First it indicated that the Federal Government believed that progress in health depended on research. Second, it encouraged the members of departments of health to engage in research. Third, it made it possible for money from these Health Grants to be used for grants-in-aid of research in universities; this assistance might take the form of furnishing and equipping special installations.

In the meantime (1947) two foundations were established in the interest of supporting research in medicine, the National Cancer Institute of Canada, and the Canadian Arthritis and Rheumatism Society. More recently there have been created the National and Provincial Heart Foundations, the Multiple Sclerosis Society, the Muscular Dystrophy Association, and other organizations which appeal to the public for support for research; provincially supported foundations such as the Alcoholism and Drug Addiction Research Foundation and the Ontario Cancer Treatment and Research Foundation; and private organizations such as the Canadian Life Insurance Officers Association and the J.P. Bickell Foundation—all of which support research in medicine.

In 1960 the Medical Research Council was created, in succession to the Division of Medical Research of the National Research Council, with a budget of $3.3 million for its first year. Within that fiscal year, the funds for support of research in medicine in the universities and hospitals of Canada, derived from Canadian sources such as national and provincial governments, national foundations and private agencies, exceeded $11 million. (In it's own installations, the Federal Government spent, in addition, $3.5 million.) The Canadian universities in the same year had support from American sources of approximately $1.5 million, largely from the National Institutes of Health. The total federal support, $10.8 million, may be compared to the national support provided by the U.S.A. – viz., $890 million!

Canadian contributions since the discovery of insulin have not been inconsiderable. They include the isolation of hormones from the parathyroids, the pituitary body and the placenta; the introduction and use of anticoagulants; the use of refrigeration in major surgery; pioneer operations on the heart; the identification of the sex chromatin; special methods for the cultivation of mammalian cells; the identification of the function of certain areas in the cerebral cortex; methods for the surgical treatment of epilepsy; the discovery of the nature of certain diseases of the liver; the identification of certain carcinogenic viral agents and the nature of their life history; the isolation of a natural product useful in treating a type of cancer; knowledge of the variations in metabolism in health and in disease; and a host of fundamental discoveries which fit into the general pattern of scientific knowledge.

Gilbert Turner has recently observed:[1]

> "More curative drugs have been discovered in the past twenty-five years than in the whole previous history of medicine. Research during these years has given us antibiotics; has expanded many times our knowledge of the value and uses of blood transfusion; has made possible the daily occurrence of surgery of the heart and lung; has led to notable advances in the field of anaesthesia, making such delicate surgery possible; has given us new methods of treating those with mental illness; has given us the blood bank, the bone bank, the eye bank, the blood-vessel bank; has made it possible to save lives with the artificial kidney; has shown us how to save premature babies and how careful we should be of the eyes of these babies when we use oxygen; has given us the Cobalt 60 therapy unit; tells us of the effects of noise of the jet aircraft and of certain industries on the human ear; has given us a potent weapon against poliomyelitis; and is our tool in the fight against cancer."

RESEARCH IN THE CANADIAN MEDICAL SCHOOLS

A professor in a medical school must be a capable and devoted teacher, a scholar in his field, and a skilled technician in his specialty. So equipped he will be unhappy unless he has opportunity to add to the sum of human knowledge. For this he must not be over-burdened with administrative duties nor too heavily

[1] Turner, Gilbert, Report to the Governors of the Royal Victoria Hospital, Montreal, 1958.

committed to hours of teaching, nor obliged to carry on an exhausting clinical practice. His time-budget must contain hours for reflection and investigation, and his resources for scholarly achievement must provide facilities, assistance and financial support sufficient to enable him to exploit his investigative aptitudes and original ideas.

He must therefore have: a teaching staff in numbers and capacity sufficient to share with him his teaching responsibilities; access to a library liberally supplied with journals and other publications; well equipped laboratories and (if he be a clinician) access to patients whose illnesses are susceptible to investigation; graduate students and skilled technicians; research grants sufficient to meet the ordinary as well as the unusual expenses of his researches.

The strength of a teaching department depends greatly on the enrichment provided by a research programme. This is necessary as a stimulant to the teachers, as a discipline and experience for the interns and residents bent on graduate training in a teaching hospital, and an essential component of the education of the graduate student in a basic science department. Indeed, without progress in research there can be no progress in medical education, and the school whose teachers are untrained and inactive in research cannot hope to inspire its bright students to pursue those richly rewarding careers in the universities and hospitals which lead to improvement in the understanding of health, and in the treatment of illness. And it is upon a continuing supply of those whose training is commenced and concluded in such an atmosphere that we must depend for teachers in our medical schools.

What is needed for the successful prosecution of research in medicine? The first need is good leadership, men of inspiration and imagination, who can devise experiments and attract young men to work with them. The second is a suitable place to work. The third is financial support for the expenses incidental to research — the purchase of equipment and supplies, the maintenance and housing of animals, salaries for technicians and assistants. Finally we need the opportunity to introduce young people to the excitement of discovery, of becoming skilful and devoted to a life of investigation. They must be maintained on fellowships and must have the expectation of continued employment when they have become trained.

Provision may be made in a research grant for the employment of undergraduate medical students as assistants. The normal procedure is to engage young men or women for vacation work, in close association with trained investigators or graduate students. This opportunity has been found to create such an interest in the employee that he returns in the succeeding vacation, eager to continue the experience; and many young medical scientists will attribute their dedication to their vocation to the encouragement created during undergraduate days.

A practice which is carried out in the U.S.A., and has found some support in Canada, is to permit the medical undergraduate, at the end of his first or

second year, to suspend his medical course for one year, and to work instead as a research assistant. He may take some collateral course work. This year of work entitles him to receive a bachelor's degree in science. An alternative method to attain similar experience and qualify for the degree may be to spend his summer vacations under the same director.

This practice should be encouraged, for it promises to lead its participants into an academic life, and to increase the number of teacher-scientists who will come from our medical schools.

LEADERSHIP

The Canadian medical schools are studded with men who have shown the aptitude, the imagination, the enthusiasm, and the skill to do good research, and to captivate the young scientists. Unfortunately many of them are insufficiently supported with staff, so that their teaching and administrative responsibilities reduce their investigative output. This burden is chiefly due to the inadequacy of the teaching budget. As a consequence, Canadians of great promise who were trained in our laboratories or in foreign countries, have been enticed to work in the universities and other institutions in the U.S.A. The drain is serious; the American schools offer larger salaries, richly supplied laboratories, and easy access to very liberal research grants; it is not surprising that our medical schools are understaffed.

THE COMPETITION OF RESEARCH AND TEACHING

There is an unfortunate tendency, on this continent, to judge the value of a teacher-scientist according to the volume of publications arising from his researches. Even brilliant teachers may become so absorbed in their investigations that they may neglect or forget their pedagogical responsibilities. To support their research programmes, they may apply for grants from government or other agencies. Many find that it is easier to obtain research grants than liberal teaching budgets. With large grants they may hire technicians and employ graduate students who demand time which should be devoted to undergraduate teaching. This practice has begun to alarm thoughtful medical educators.

In a university, every trained researcher who holds an academic appointment should do *some* teaching, according to a schedule prepared by his chief; and he should be held rigidly to it. As a control on the time devoted to research, the application for research funds should be countersigned by the head of the department, and by the dean. In some institutions and by some granting agencies, the signature of the President is also required. These administrative officers should see that funds which can not be spent wisely in the time and space available should not be sought. On the other hand, they must see that staff and premises are available in numbers and volume essential to the discharge of the research responsibliity of the institutions.

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RESEARCH FACILITIES

The deans of medicine in the Canadian universities estimate that a basic science department should have available as much space for research as is provided for teaching, and, in addition, commodious quarters for housing animals. The cost of building laboratories for research is greater than for providing lecture rooms and laboratories for teaching, for the expensive mechanical, plumbing and electrical facilities must be more liberally installed. The universities are hard pressed to purchase facilities for teaching alone; research space in all medical schools is provided only after teaching needs are satisfied. The apparatus, technical and electronic equipment needed in research, is beyond the budgetary allowance of a university teaching department, even if it has the good fortune to have usable research space.

The Department of National Health and Welfare is the only organization of government which has been liberal in equipping research laboratories. Under the Health Grants programme, a province may use a portion of the Public Health Research Grant to provide research furniture and equipment in a newly-constructed university laboratory. This has been done very generously in Ontario, Quebec and British Columbia. *But the university must erect the building from its ordinary sources of financial support.*

In 1957, the deans of the 12 Canadian medical schools, representing the Association of Canadian Medical Colleges, presented a brief to certain members of the Federal Cabinet, asking that a committee be set up to study the needs of support of medical research by the Government of Canada. A Special Committee on Medical Research was named in February 1958, by the Chairman of the Privy Council Committee on Scientific and Industrial Research, with the following terms of reference:

> "To review the procedure by which the Government of Canada supports medical research outside its own installations, and the extent to which this support is adequate, and to make recommendations for coordinating the programme of Departments of Government in this field."

Professor R.F. Farquharson was appointed Chairman; the committee reported to government in November 1959; its report is colloquially described as "The Farquharson Report". It includes this statement:

> "The buildings originally erected for the use of the older medical schools were designed for teaching, with little provision for research. Many of these are still in use; research is conducted in meagre quarters, in laboratories designed for teaching or even in corridors. New buildings or extensions to older buildings have been erected in some schools in the past decade, and buildings combining teaching and research are planned; but university resources have not been adequate to provide all the laboratories necessary for research."

The Committee which prepared the Farquharson Report asked the deans, in 1958, to estimate the cost of supplying their schools and teaching hospitals with the laboratory space necessary for research. The estimate was recorded in the Report, and its implementation was recommended: $25 million for the medical

schools, and $12 million for the teaching hospitals, to be expended in the three to five years succeeding 1959. *No part of this money has been provided, and university investigators are crippled in their efforts to expand their graduate training programmes because they cannot give shelter to candidates, nor house the equipment essential to their researches.*

FINANCIAL SUPPORT

In Canada, research in medicine is supported by agencies of government (federal and provincial,) by voluntary agencies, and by funds derived from sources outside the country. The programme of financial support offered in Canada will be reviewed with a comparison of the extent to which research is supported in Great Britain and in the U.S.A.

ASSISTANCE TO THE UNIVERSITIES FOR INDIRECT COST OF RESEARCH

The programme of assisted research grants initiated by the National Research Council more than 40 years ago was based on the premise that the recipient was to be *assisted,* and that the university in which he worked was to provide space and facilities out of its own resources. This model was adopted by the other granting agencies as they were created. The research programme in medicine has grown so large in the past few years, that universities and hospitals are beginning to look askance at the cost of providing laboratories, heat, light, cleaning service, and other service. It is not unusual that the total amount of grant money received for research by the staff of a faculty of medicine equals the total faculty budget for salaries for teachers, and supplies for teaching; this may double the cost to the university of accounting alone.

Protests of universities have led to a practice among agencies in the U.S.A. to provide "overhead" items in the grants made to medical schools. The amount varies from 10 to 50 per cent of the total grant. The deans of the faculties of medicine, at the meeting of the Association of Canadian Medical Colleges in 1961, passed a resolution asking that granting agencies make grants to the universities to assist in meeting the indirect costs of administering research grants.[1]

LIBRARY

There is no instrument which is as essential to research productivity in all departments of a medical school, as is a good medical library, properly equipped with the journals which record progress in research. No medical dean is satisfied with the quality of his medical library in terms of its support of research activity. Physical facilities are generally poor, budgets are small, holdings of journals are minimal, all are under-staffed; in only three of the twelve universities may it be

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[1] To defray the cost of additional clerical and administrative services in departmental and university offices, additional quarters for animals, instrumentation, photography, etc., and additional equipment not covered by the grant.

said that conditions approach an adequate level. It is not unreasonable to ask that agencies which support research in the medical fields, make annual grants for the maintenance and improvement of medical libraries. The Association of Canadian Medical Colleges has sponsored an investigation of the medical library facilities in the Canadian universities. The recommendations proceeding from this survey should be heeded and implemented.[1]

SUPPORT OF MEDICAL RESEARCH BY GOVERNMENT IN CANADA

The Government of Canada supports research in medical fields in its own installations, and, extramurally, by grants and fellowships held in university laboratories, in hospitals and in provincial public health laboratories. Funds for these purposes are provided by the Department of National Health and Welfare, the Medical Research Council (which succeeded the Division of Medical Research of the National Research Council in 1960), the Defence Research Board, and the Department of Veterans Affairs. Except the Medical Research Council, all of these agencies have intramural programmes; the Department of National Health and Welfare and the Defence Research Board spend one-third of their budgets on activities within their own laboratories, and the Department of Veterans Affairs conducts clinical research within its own hospitals. The Queen Elizabeth II Fund for Research in the Diseases of Children, established by the Government in 1959 with a capital of one million dollars, yields $55,000 per annum which is spent on fellowships for training, and in salaries for the maintenance of trained scientists. The National Research Council supports research in dentistry, on a budget of approximately $180,000.

The growth of federal support for the extramural research programme since 1946 is shown in Table 10–1.

THE MEDICAL RESEARCH COUNCIL

The Medical Research Council provides grants-in-aid of research, scholarship and fellowship awards for training, and stipends for trained scientists who may work in universities. While its primary programme is in the support of *basic* research, it is keenly interested in clinical investigation and in assisting investigations in any field of medicine.

Grants-in-Aid

Operating grants-in-aid are available to members of faculties of Canadian universities, and to scientists active in hospitals or employed in other institutions. An award may be in the form of an annual grant, a term grant which assures support for three years, or a block grant which (on either an annual or a term basis) supports the activities of a *group* of associated investigators. The investigative fields fall mainly into four categories: biochemistry; physiology and pharmacology; bacteriology and pathology; clinical investigation. Subcommittees appointed

[1] See Chapter 12 and Appendix 6.

TABLE 10-1

FEDERAL SUPPORT FOR EXTRAMURAL MEDICAL RESEARCH, 1946–1962

Year	Extramural Medical Research Expenditure by Government of Canada				
	National Research Council	Dept. National Health and Welfare	Defence Research Board	Dept. of Veterans Affairs[1]	TOTAL
			($ thousands)		
1946–47	158				158
1947–48	271				271
1948–49	357	150	40		547
1949–50	498	326	113		937
1950–51	539	720	179	1	1,439
1951–52	578	959	542		2,079
1952–53	617	1,248	357	2	2,224
1953–54	642	1,639	380	356	3,017
1954–55	652	1,600	365	367	2,984
1955–56	693	1,554	404	352	3,003
1956–57	849	1,740	419	375	3,383
1957–58	894	1,937	373	383	3,587
1958–59	1,523	2,000	409	303	4,235
1959–60	1,970	2,640	414	328	5,352
1960–61	2,300	3,600	448	331	6,679
1961–62	3,285[2]	3,481	450	359	7,575
1962–63	4,083[2]	3,368	447	409	8,307

[1] The current opinion of the D.V.A. regards its research programme as entirely intramural; since the programme is carried out by scientists in various hospitals who receive grants for specific investigations, it is included among the extramural researches.

[2] Through the MRC.

Source: Annual Reports of National Research Council, Department National Health and Welfare.

by Council review the applications and submit them to competent referees for recommendations.

Major equipment grants are offered for the purchase of units of special research equipment whose cost will exceed $3,000, and could not be included in the items provided by an operating grant, e.g., an electron microscope costing $15,000 to $35,000.

Personnel Support

Training grants offered are summer scholarships at $1,000, for medical undergraduates who will work in the laboratory of a grantee during the summer vacation, and medical research fellowships available to medical and veterinary graduates (and, in specific instances to those who have recently received the Ph.D.) at stipends of $3,000 to $5,000. Small supplements are provided for fellows who have dependent children. The fellowship is exceptionally tenable abroad; it is subject to three renewals. Undergraduate and graduate students may be employed as research assistants

under operating grants; here they obtain excellent training and, through this experience, many are drawn to seek an academic career.

As an assistance to universities in their development of medical research programmes, the Medical Research Council provides salaries for Medical Research Scholars and Associates. A candidate must have matured in or completed his research training. The sponsoring university must make application for the award and undertake to supply research facilities and adequate accommodation.

The Medical Research Scholarship provides support for the investigator who has shown promise of ability to initiate research and carry it out independently. He must be given opportunity to develop and demonstrate this ability without the obligation of engaging in a heavy teaching programme. The initial appointment is for a three year period at a salary depending on experience, rising from $7,300. A single renewal for a period of two years is permissible, but it is hoped that the initial experience of the scholar will fit him for promotion to the rank of Medical Research Associate.

The candidate for an Associateship must have completed his research training, demonstrated his productiveness and achieved a high reputation as a scientist bent upon a research career. The University must offer the candidate an academic rank in the appropriate faculty. The initial appointment is for three years; a renewal carries the understanding of permanence according to the custom of the University. The present salary scale ranges from $8,300 to $16,200 per annum.

A summary of the awards of the Medical Research Council for 1961–62 and 1962–63 is found in Table 10–2.

The Farquharson Report recommended that for the year 1960–61,the budget of the Medical Research Council be set at 4 million dollars, and "that substantial annual increments be provided to meet the increased operational costs, and inevitable growth of medical research." It has barely reached this level for 1962–63. The expansion so desirable has not occurred, and our research productivity has lagged.

THE DEPARTMENT OF NATIONAL HEALTH AND WELFARE

The Department of National Health and Welfare describes its research programme in the following terms:

"The Department of National Health and Welfare assists surveys and experimental investigations designed to obtain valid information and to develop methods which are likely to have practical application for improving the health of the Canadian people. Specific objectives related to recognized public health, and medico-social problems are favoured. Studies may be concerned with the following, among other areas:

(a) The prevention of disease and disability;
(b) The promotion of health and physical fitness;
(c) The etiology and epidemiology of disease, including field studies;

TABLE 10-2

EXTRAMURAL SUPPORT OF MEDICAL RESEARCH BY GOVERNMENT OF CANADA

	1961				1962			
	Research grants		Fellowships		Research grants		Fellowships	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
		$		$		$		$
Medical Research Council	337	2,769,455	103[1]	515,519	427	3,414,038	129[1]	669,844
National Health and Welfare	310	3,481,076			286	3,367,276		
Veterans Affairs[3]	47	359,825			86	409,131		
Defence Research Board	59	441,520	1	8,662	66	438,354	1	9,211
N.R.C. Dental Research	25	114,750		16,750	28	146,215		31,700
Queen Elizabeth II Fund			4[2]	23,500			8[2]	51,700

[1] Figure includes fellows, research associates, and summer scholars.

[2] Figure includes fellows and scientists.

[3] Since the D.V.A. programme is carried out by scientists in various hospitals who receive grants for specific investigations, it is included among the extramural researches.

Source: Communications to the Royal Commission on Health Services.

(d) The diagnosis and treatment of disease, including evaluation of results being achieved;

(e) Rehabilitation."

It offers no fellowships for training in research.

Assistance in research is available through the Health Grants Programme in which specific grants, listed below, are made to the provinces, to assist in their development of or extension of services. A portion of the grant may be used for research within the province, on the recommendation of the provincial minister of health.

General Public Health Grant
Tuberculosis Control Grant
Mental Health Grant
Cancer Control Grant
Medical Rehabilitation and Crippled Children Grant
Child and Maternal Health Grant

Additionally there is a Public Health Research Grant, not allotted in specified amounts to provinces, but for which application may be submitted from scientists in any province.

Each application for a research grant from any of these grants must be made to the Minister of Health in the province in which the applicant is employed. If recommended by provincial authority it is referred to Ottawa, where it is examined

by referees. Decisions are sent to the appropriate provincial minister, who in turn sends them to the president of the university from which the application emanated. Ordinarily grants are made on an annual basis, but, at the discretion of the Department, a grantee may be asked to accept the grant on a three-year term basis.

Table 10–2 lists the grants for the years 1961–62 and 1962–63.

THE DEFENCE RESEARCH BOARD

The Defence Research Board plans its research programme after the pattern set by the Medical Research Council of Great Britain. It conducts research in its own establishment at Downsview, Ontario, on which it spends two-thirds of its budget; it has set up research units in four universities (Arctic Medical Unit at University of Manitoba; Radiobiology Unit at University of Toronto; Psychiatry Unit at University of Ottawa; Aviation Medicine Unit at McGill University); it offers grants-in-aid of research to applicants in medical schools. Investigations proposed should be related to the interests of defence, which are defined as:

Aviation and Naval Medical Research
Radiation: Protection and Treatment
Nutrition
Auditory and Vestibular Research
Visual Problems
Epidemiology
Shock and Plasma Expanders
Management of Burns and Wounds
Infection and Immunity
Arctic Medical Research
Psychiatry
Toxicology
Blood and Related Problems

In each of these fields a panel is appointed, which reviews applications.

Table 10–2 lists the grants for 1961–62 and 1962–63.

THE DEPARTMENT OF VETERANS AFFAIRS

The research programme of the Department of Veterans Affairs is conducted in its own hospitals, which, because they are associated with medical schools and are served professionally by physicians who have university appointments, may be said to contribute to the medical schools' research output. Five clinical investigation units have been established; these consume about one-quarter of the research budget. A few young physicians in the Services are supported by small stipends during training outside the establishments. The remainder of the budget is used in support of applications which come from staff members, who conduct investigations in the wards and laboratories of the DVA hospitals.

The number of these grants for 1961–62 and 1962–63 is listed in Table 10–2.

In order to place the Canadian Government's contribution to medical research in perspective, the assistance given by some other central governments is described below.

SUPPORT OF MEDICAL RESEARCH BY GOVERNMENT IN GREAT BRITAIN

It is difficult to determine the spendings of the British Government on medical research, but some estimate may be made by an examination of the reports of the University Grants Committee and of the Medical Research Council.

The universities in Great Britain derive their chief support, apart from the income on endowments, from the Government, through the University Grants Committee. The terms of reference of the University Grants Committee,[1] as amended in 1952, are: "To enquire into the financial needs of university education in Great Britain; to advise the government as to the application of any grants made by parliament towards meeting them; to collect, examine and make available information relating to university education throughout the United Kingdom and to assist .... in the preparation and execution of plans for the development of the universities in order to ensure that they are fully adequate to national needs."

A university may devote part of its income from the University Grants Committee to research; it may also receive research grants from other agencies of government, including the Medical Research Council. The report of the University Grants Committee on University Development, 1952–57[2] speaks of the "dangers which might arise if the universities felt obliged for financial reasons to devote an undue proportion of their research effort to research sponsored by the Government or other outside agencies." While in 1956–57 the receipts for research support given to the universities represented 6.5 per cent of the total income, the cost of scientific research done in the universities was estimated to represent nearly two-thirds of their budgets. (This probably included the cost of maintenance of buildings and the percentage of salaries of teachers related to the time spent on research, estimated to be 50 per cent). Obviously, however, a good share of the government grant to a British university is spent directly on research.

The report continues, "The research which is financed by the Research Council and the Royal Society in the Universities does not in general give rise to these dangers since it follows lines which are selected predominantly by the university workers themselves. It may, however, be asked why the intervention of these bodies should be necessary, and why such research should not be financed by the universities from general income .... If research workers in universities could obtain finance for lines of research which they wished to pursue from one source only, it is to be feared that some scientific seedlings would fail to survive the chill blasts to which they would be exposed in competition for funds within universities .... The research worker therefore needs a second string to

[1] University Development – Report on the Years 1947 to 1952 – London: Her Majesty's Stationery Office, 1953, Cmnd. 8875, p. 6.

[2] University Development – Report on the Years 1952 to 1957 – London: Her Majesty's Stationery Office, 1958, Cmnd. 534, p. 44–45.

his bow in his search for finance ...... There is inevitably an element of speculation in backing new research ...... It is therefore desirable that newly emerging lines of research should have sources of funds alternative to general university income and thus be able to obtain outside protection against the hazards of inter-departmental competition for funds within the university."

The responsibility of the university to assume the cost of maintaining a programme which has been maintained for some time by a research granting agency is suggested: "A problem of practical importance may be created by the very success of a branch of research supported by a Research Council. Examples will be recalled of original work ...... which have been financed by Research Councils and have ...... developed into branches of learning of such importance as to require representation within the established departments of the universities. Virology, chemical microbiology, and biophysics started in this way ...... It is in the interest both of the universities and the Research Councils that a line of original scientific work which has proved itself should be financed in the ordinary way from the general university income ...... Unless this happens an undue proportion of the newer activities within the university might come to be supported under conditions of external control incompatible with academic independence." It is to encourage this evolution that the Medical Research Council has recently instituted block grants to support research groups, with the understanding that within five to fifteen years the university will maintain the programme with its own resources.

There are 24 universities in Great Britain supported by the Government through the University Grants Committee. Fifteen of these have medical schools; one, the University of London, includes 15 medical schools. The sum of grants received from the University Grants Committee by the universities which support medical schools was, in 1959–60, £50,569,382.[1] In addition, these universities received £4,237,184 for research from other sources; these would include the Medical Research Council.

The Medical Research Council was incorporated in 1920 in succession to the Medical Research Committee, which had been established in 1913 under the National Insurance Act of 1911. The new Council was placed under the Committee for Medical Research of the Privy Council whose Chairman is the Minister of Science. The Chairman of the Medical Research Council reports to the Minister of Science who, in turn, reports to Her Majesty. The Council took over the programme of the National Institute for Medical Research, which had been set up at Hampstead in 1915, under the direction of Sir Henry Dale, and continues its intramural research programme under that title, at Mill Hill. Research units have been established under its aegis in universities and university hospitals; these are now maintained and staffed by the Medical Research Council, and are engaged in the study of subjects considered to be of national interest. While a majority are associated with universities, in which many of the investigators are given academic rank and are encouraged to teach, they cost the universities only the provision of space, and in turn bring a rich reward in productivity and stimulation.

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[1] University Grants Committee — *Returns from Universities and University Colleges in Receipt of Treasury Grants*, Academic Year 1959–60, London: Her Majesty's Stationery Office, 1961, Cmnd. 1489.

The budget of the Medical Research Council for the year 1960–61 was £4,952,529.[1] In that year it awarded grants to universities and hospitals amounting to £851,835, made up of 271 "temporary research grants", 7 research group grants, 153 scholarships for training (available to recent medical, dental or scientific graduates), 33 fellowships for medical graduates at an advanced level of training, and special grants for the purchase of expensive equipment. But the great contributions to extramural research were in the provision of 5 block grants to established research institutes and laboratories, the maintenance of 73 research units, established in the universities and associated hospitals, and the appointment of 86 members of the staff of the Medical Research Council to posts in the universities – "external staff" – at a total cost of approximately £2,907,069.

The support of medical research in universities by Government in 1959–60 includes the assistance provided by the Medical Research Council (£2,354,993 for Research Units, etc., plus £582,079 for grants, scholarships etc. – total £2,937,072) and a sizeable fraction (5%–£2,500,000) of the £50,000,000 which the University Grants Committee made available to universities which support medical schools, making the grand total of £5,500,000. The total budget of the Medical Research Council for 1959–60 was £3,872,153; for 1961–62 it is £5,646,500[2]–an increase of 46 per cent. Assuming a proportionate rise in the amount of money available for research in the medical schools, from the University Grants Committee, the total support of research in medicine, in the medical schools and hospitals, provided by the Government, would equal £8,000,000. Whatever the actual figures may be for the past few years, it is significant that they exceed greatly the Federal support in Canada, and that the Nobel Prize has been awarded in physiology and medicine, to British scientists 26 times.

Incidentally, Ingelmark reported (1959)[3] that in Sweden, with a population of 7 million, Government grants for medical research in 1958 amounted to $16,500,000. In Sweden, investigators have obtained the Nobel Prize in physiology and medicine eight times, compared to only once in Canada.

SUPPORT OF MEDICAL RESEARCH BY GOVERNMENT IN THE U.S.A.

The support of medical research, by Government, is more liberal in the U.S.A. than in any other country; this is reflected in the award of the Nobel Prize in physiology and medicine 38 times. Federal agencies which provide this support are: The National Institutes of Health, the National Science Foundation, the Department of Defence, the Veterans' Administration, the Atomic Energy Commission, the National Aeronautics and Space Administration, and the Department

[1] *Report of the Medical Research Council* for the Year 1960–61, Her Majesty's Stationery Office, 1962, Cmnd. 1783.

[2] The British Information Services paper No. R.5578, published May, 1963, reports that the total expenditure on medical research, by government, in 1961–62 was £14.5 million, including 'estimated expenditure of Health Departments, the Medical Research Council, the General Register Office and the Air Ministry, together with the approximate amount which is estimated to be devoted to medical research out of the general grants made to universities on the advice of the University Grants Commitee.'

[3] Proceedings of the Second World Conference on Medical Education. Chicago 1959, *Medicine, A Life Long Study*, New York: World Medical Association, 1961, p. 494.

of Agriculture. The total funds for the fiscal year 1962 amount to $890 million. The agency which provides the greatest assistance to the universities is the National Institute of Health, which operates under the Department of Health, Education and Welfare. Its total budget in 1960–61 was $550 million, including $454 million for the extramural grant and award programme. An unusual feature is its policy of making awards to scientists or agencies outside the USA.

The first federal medical research laboratory maintained by the U.S. Government was established in the Marine Hospital, Staten Island, New York, in 1887. In 1901, a Hygienic Laboratory was built, three others followed, and by 1931 the group was renamed the National Institute of Health. The organization was moved to Bethesda in 1938, several laboratories were built on this site, and, in 1946, modest provision was made for extending its investigations extramurally by a programme of grants-in-aid, fellowships and training grants. The name was changed in 1948 to National Institutes of Health. Since the conclusion of the World War 11, the U.S. Government has been extraordinarily sensitive to the advantages accruing from research in all fields; annual appropriations have increased very greatly each year and the allowance for research in the health field has been maintained at 4 per cent of the total.

The intramural programme of the N.I.H. is carried out in seven National Institutes: the Institute of Allergy and Infectious Diseases, the Institute of Arthritis and Metabolic Diseases, the Cancer Institute, the Heart Institute, the Institute of Dental Research, the Institute of Mental Health, and the Institute of Neurological Diseases and Blindness. These comprise active basic research laboratories, well staffed, and extremely well supported, whose programmes are well integrated with those in the Clinical Center, a 500-bed hospital recently erected. To this hospital are admitted patients who may be referred by any American physician for special study related to the interest of the N.I.H. The hospital contains research laboratories whose total floor space is two and one half times that devoted to patient care. The institutes act as training centres for the large number of young medical scientists who come each year, and are supported by fellowships. They do no regular undergraduate or formal graduate teaching. Each institute has a large budget; that of the National Heart Institute, e.g., is more than 10 times the entire spendings of the Canadian Government on medical research.

The extramural programme is directed by the Division of Research Grants, which accepts applications for assistance under four main categories: Research Grants, Research Fellowships, Training Grants, and Health Research Facilities Grants. Awards to Canadian applicants may be made in the first three categories only. The appropriations since 1946 are listed in Table 10–3.

Under these categories, there are varieties of awards, and there are, as well, additional subsidiary categories. The research grants provide funds for salaries, equipment, supplies, travel, etc., and, in order of magnitude and numbers of personnel involved, may be project grants, project-programme grants, or centre grants. The research fellowship grants are given for training, either pre-doctoral ($1,800 – $2,200), post-doctoral ($5,000 – $6,000), or special, for advanced training with appropriate stipend.

TABLE 10–3

APPROPRIATION HISTORY EXTRAMURAL PROGRAMME OF NATIONAL INSTITUTES OF HEALTH, UNITED STATES

Year	Research grants	Fellowships	Training grants	Health research facilities
1946	780,000	44,000	29,000	–
1947	3,576,000	178,000	250,000	–
1948	9,145,000	520,000	2,810.000	2,303,000
1949	10,871,000	1,115,000	3,930,000	–
1950	13,065,000	1,448,000	6,415,000	5,775,000
1951	16,713,000	1,565,000	6,928,000	9,459,000
1952	18,173,000	1,755,000	7,392,000	4,625,000
1953	20,374,000	2,024,000	8,194,000	–
1954	28,866,000	2,133,000	10,813,000	–
1955	33,918,000	2,562,000	11,051,000	–
1956	38,038,000	2,800,000	14,502,000	–
1957	93,300,000	5,397,000	28,075,000	30,000,000
1958	101,265,000	6,812,000	32,560,000	30,000,000
1959	145,391,000	10,408,000	49,902,000	30,000,000
1960	202,948,000	14,570,000	75,037,000	30,000,000
1961	292,679,000	22,000,000	110,000,000	30,000,000
1962	447,589,000	29,080,000	118,506,000	30,000,000

Source: Public Health Service and Grant Awards, General Information. Issued by the Division of Research Grants, National Institutes of Health, Public Health Service, Dept. of Health, Education and Welfare, Bethesda 14, Md., September 1961.

Training grants are available to medical schools, dental schools, schools of public health and nursing, schools of osteopathy, to assist in undergraduate instruction, and for providing special training for graduates who will become investigators, or will be interested in the public service. Funds may be used for scholarships, salaries for teachers, improvement of facilities, etc.

Health research facilities grants assist in the construction and equiping of facilities related to research in the health fields. The grant may not exceed 50 per cent of the cost of the research portion of the facility. These are not available to Canadian institutions.

In addition to these grants, there have been instituted recently, research career awards and institutional grants; neither are available to Canadians. The research career awards are available, in the USA, to institutions which wish to increase their numbers of investigators of unusual potential. The sponsoring university suggests an appropriate salary; it may not exceed $25,000 *per annum*. There are two categories: research career development awards and (for more senior scientists) research career awards. Institutional grants are available to medical schools and other eligible institutions, for general research support. A basic grant of $25,000 is supplemented by a sum based on the school's volume of research grants, e.g., 5 per cent of the first $1 million of federal grants, 10 per cent of the first $1 million of non-federal grants.

Accepting the figure of $890 million as representing the current national medical research expenditure, the national institutes of health estimates that by 1970 the annual expenditure will be $3 billion. Approximately 40,000 trained medical research workers were active in the USA in 1960. Three-fifths of these were in the medical schools. The average research support necessary to maintain the activity of a trained investigator was $18,000 in 1960. Expenditures per professional worker will rise in the next 10 years, reflecting (1) more complex and precise instrumentation, (2) greater use of higher paid and more highly skilled technicians, and (3) large-scale clinical research programmes (the N.I.H. have established 75 clinical research centres in American medical schools and hospitals, and an additional 25 centres will be established by the end of 1962). The increase in activity will raise the average support of a professional worker to $40,000 *per annum* by 1970. By this time it is estimated that 75,000 professional workers will be needed in the USA. Allowing for 8,000 needed for replacements due to death, retirement, etc., it is estimated that 45,000 additional professional workers will be required over the next decade.

The policy of making grants to persons or agencies outside the USA has led to a great stimulation of research in countries less opulent. In 1961, the national institutes of health made 17,269 grants and awarded 4,498 fellowships, at a total cost of $443,626,208. Of these, 550 grants and 247 fellowship and traineeship awards were made to recipients in foreign countries, at a cost of $10,636,269. Canadians received 85 grants, 6 fellowships and 2 traineeships amounting to $1,393,091. In 1962, the awards to Canada are 90 grants, 3 fellowships and 1 traineeship, totalling $1,622,955.

ASSISTANCE TO CANADIAN SCIENTISTS FROM SOURCES APART FROM THE GOVERNMENT OF CANADA

Before Government considered offering support for medical research, the Banting Research Foundation encouraged Canadian investigators, out of its annual revenue of $30,000. In the late nineteen-forties there commenced a growth of voluntary agencies which collected funds to support research in special fields, e.g., cancer, and in Ontario the provincial government began to show an interest in the health problems of its people by setting up research foundations. Grants from these agencies were supplemented by contributions from charitable foundations, and business organizations such as the Canadian Life Insurance Officers Association. The annual sum of grants from these agencies exceeds 3.5 million and is used gratefully by those who are fortunate enough to receive them, yet they fail to meet the needs of our scientists of whom many must look abroad for assistance. The National Institutes of Health of the USA believe that research in medicine should be supported in any country where good scientists work; Canadian investigators whose government offers only meagre assistance are forced to go to that of its neighbour, whose generosity is expressed in grants which exceed $1 million annually.

Grants made in 1961 and 1962 to Canadian medical scientists from agencies apart from the government are listed in Table 10–4.

TABLE 10–4

SUPPORT OF MEDICAL RESEARCH BY AGENCIES
APART FROM FEDERAL GOVERNMENT

	1961				1962			
	Research grants		Fellowships		Research grants		Fellowships	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
		$		$		$		$
Provincial Agencies								
Alcoholism & Drug Addiction Research Foundation	10	66,720	–	–	3	17,891	–	–
Ontario Cancer Treatment & Research Foundation	38	239,406	7	45,500	38	337,617	7	50,000
Total	48	306,126	7	45,500	41	355,508	7	50,000
Voluntary Agencies, Foundations, etc.								
Canadian Heart Foundation	99	661,507	52	336,600	111	759,728	52	369,450
National Cancer Institute	84	1,201,828	–	51,962	89	1,447,245	16	48,950
Canadian Arthritis & Rheumatism Society	15	110,020	16	69,164	17	90,801	17	85,275
Muscular Dystrophy Association	25	226,381	12	53,441	26	236,772	14	59,175
Atkinson Charitable Foundation	4	128,981	–	–	5	81,044	–	–
J.P. Bickell Foundation	7	65,000	–	–	3	22,640	–	–
Multiple Sclerosis Society	9	65,423	1	4,600	9	62,289	3	7,900
Canadian Life Insurance Officers Association.......	–	36,100	14	79,999	–	22,900	13	67,920
National Sanitarium Association	6	32,400	–	–	7	39,155	–	–
Picker Foundation...	2	7,950	–	–	2	11,100	–	–
Canadian Mental Health Association	2	11,250	–	–	4	21,875	–	–
Banting Research	18	59,760	–	–	17	57,513		
Total	271	2,606,600	95	595,766	290	2,853,062	115	638,670
Canadian Total .	319	2,912,726	102	641,266	331	3,208,570	122	688,670
U.S. National Institutes of Health	–	1,198,550	–	194,535	–	1,597,953	–	15,002
Grand Total...	–	4,111,276	–	835,801	–	4,806,523	–	703,672

The Deans of the Canadian medical schools report that there are at least 1,200[1] professionally qualified members of staff who would be eligible to submit applications for research grants. The sum available in 1962, 12.5 million dollars (made up of support by Government and other Canadian agencies), would provide for each of these, $10,416. If each were supported by $18,000 (the current average support by national agencies in the USA) the sum necessary would be $21,600,000 for grants-in-aid. But the support which, in Canada, corresponds to the national Government support in the USA is $7,775,000 (the sum available from MRC, DVA, DNH & W, DRB, NRC and Queen Elizabeth II Fund), which would provide for each Canadian potential applicant, $6,480.

The rapid and continuous expansion of research activity in the USA will be reflected inevitably in Canada. If, by 1970, as predicted by the NIH, the number of professionally trained independent investigators is raised in the USA from 40,000 (as in 1960) to 75,000, and each will require a basic research support of $40,000, we might expect that there will be a proportionate increase in numbers and financial need in this country .This would raise the number of qualified Canadian researchers to 2,244, and the grants necessary from federal sources to $27.2 million (at the current rate $6,480 x 1.87 x 2,244); should we accept the basic research level to be $40,000, the federal support necessary would be $89.75 million.

Currently there are approximately 240 research fellows and research associates supported by research agencies in Canada, at a total cost of approximately $1.4 million; only half of this comes from federal funds. At least one-third of these are fully trained (research associates) or within a year of completion of their training, so that we may expect that we have a pool of 150 young scientists who will not be fully trained in less than three to five years. If we are to depend on this source for our teachers and investigators for the next few years, and require by 1970 a total research faculty in the Canadian medical schools of at least 2,200, we must provide a major increase in the funds for graduate training, and for the support, in the medical schools of a much larger number of research associates. Generous annual increments should be provided by the Federal Government through the Medical Research Council so that, by 1970, the annual provision for fellowships and research associateships (or their equivalent) should be at least $3.5 million. The deans of all the medical schools state that their teaching departments are under-staffed. This is the effect of small budgets, combined with the difficulty of finding suitable personnel. Liberal training grants, with the promise of funds to provide for permanent employment, will enrich the teaching and research output of our faculties of medicine.

THE ADMINISTRATION OF GRANTS-IN-AID BY THE GOVERNMENT AGENCIES

The Medical Research Council and the Defence Research Board have similar procedures in treating applications for grants-in-aid and in administering the

[1] Approximately one-third of these hold part-time teaching appointments.

grants. There is such similarity in the two application forms that they might be easily transposed. An application is directed to the agency, which submits it to qualified referees through a panel or subcommittee. When an award is made, money is sent to the university in which the applicant is employed. A simple accounting, semi-annual for the Defence Research Board, annual for the Medical Research Council, in which the university certifies to the spendings under salaries, equipment, supplies and travel, satisfies these agencies. There is flexibility in the use of the grant; while the applicant specifies, e.g., the amount he wishes to spend on equipment, he is not required to give minute details. An unspent balance is retained by the university to be a component of a renewal of the grant, or of a subsequent grant.

The application form provided by the Department of National Health and Welfare requires information practically equivalent to that in the two other agencies, but in different sequence. Indeed, it should be possible to design one form applicable to the Defence Research Board, the Department of National Health and Welfare, and the Medical Research Council. But the cumbrous and inflexible method of administration of the National Health Grants frustrates grantees and university accountants.

An application is made on a thin-paper application form. This records: a brief description of the project, and its relation to the health field; details of the personnel to be engaged in and employed under the grant, with the hours per week to be devoted to the work, and the rate of pay; description and unit cost of each piece of equipment to be purchased; and the amount needed for miscellaneous expenses such as animals, chemicals, glassware, etc. Five copies of the application are sent to the provincial minister of health, whose consent and recommendation are required before they may be sent to the Department of National Health and Welfare for consideration by their referees. When the award is approved, an officer of the provincial department of health sends a note, *not to the applicant, but to the president of the university* at which he is employed, reporting that a grant in a stated amount for purposes which are detailed, is made for project numbered, e.g., 605–66–322; the name of the applicant is not recorded. The president must have his secretary discover who the applicant is, and have him notified. The university receives, not money, but credit, and must spend its own money until reimbursed. A detailed accounting is required by the provincial department monthly or quarterly; a month or more after this has been passed by its auditors, the university receives a cheque from the provincial treasurer for the amount of the vouchers accepted. . Auditors of the provincial department may visit the university at any time, to check the books. Meantime the grantee is tied securely to the spending of money exactly as outlined in the original application, unless he obtains authority for a change from the provincial department of health.

If the Department of National Defence can set up a simple method of handling research grants through the operation of the Defence Research Board, it should be possible for the Department of National Health and Welfare to create a procedure which will spare the time of applicants, encourage flexibility in the use of funds and reduce the administrative burden of the universities.

THE PROGRAMME OF THE MEDICAL RESEARCH COUNCIL

The Farquharson Report recommended that the Medical Research Council be established to assume responsibilities which had been assigned to the Division of Medical Research of the National Research Council, that the MRC advise (presumably the government) on policy and matters related to medical research, and "that the present extramural research programme of the Department of National Health and Welfare, the Defence Research Board, and the Department of Veterans Affairs be continued in their own special fields of interest, with such progressive increases as may be required for the normal growth of these programmes". There is no restriction on the fields in which the Medical Research Council shall offer support, while in the other agencies the interests are clearly circumscribed. It is reasonable to expect, therefore, that growth of budget and expansion of programme should be greatest in the Medical Research Council, and that, in fact, it should be the focus of reference of the government in matters concerning research in medicine.

The three other departments should, however, be permitted to pursue their programmes of extramural research support, in their own interest. It is stimulating to a department of government to have a research programme under its aegis, and expecially stimulating if a reasonable amount of work is done outside its own installations, by scientists whose interests and achievements may coincide with those of the agency. On the other hand, the intramural programmes of research in the Department of National Health and Welfare would be carried out more critically if, as in the Department of Veterans Affairs, each project were reviewed by experts apart from its full-time employees.

In inheriting the responsibilities in medicine of the National Research Council, the MRC may be said to have inherited its history, and the limited financial support with which its programme has been effected. We were at peace when the programme began with a budget of $53,000, but within a year the Canadian medical scientists were engaged, under the NRC, in an active and inspired investigation of the problems related to the safety, care and survival of those on active service, and the maintenance of health of the civil population. The research potential in the medical schools was revealed, and in 1946 the Division of Medical Research was created, with a budget of $200,000. The progressive increase in its resources is shown in Table 10–1. At the same time, the National Institutes of Health in the USA had a budget for extramural research of $843,000. From 1946 to 1962, the budget of the Medical Research Council increased to $4.3 million – a 22-fold gain; that of the National Institutes of Health increased to $625,175,000 – a gain of more than 740-fold.

The growth of the research programmes in these two countries has been in proportion to the liberality of support by their respective federal governments. The American Government has obviously had a keener appreciation of the value of research in medicine to the health of its people, and recognizes that the universities, liberally assisted by grants for buildings, training, equipment, and the ordinary expenses for scientific research, can carry out this function. Canadian productivity has, indeed, depended partly upon generous grants received from the USA;

these in the past two or three years have been equal to almost half that provided by our own Medical Research Council! Canadian medical scientists deserve much better support of their Government, and should not be required to act as mendicants, soliciting their necessities from their nearest neighbour. "The demand for new knowledge" says Sir Harold Himsworth, Secretary of the Medical Research Council of Great Britain, "is such that nothing less than the national scale will suffice."

The Medical Research Council carries out the pattern of research support handed to it by the National Research Council. It has established no research units or research institutes; it still spends most of its budgets on grants-in-aid. Its nearest approach to the programme of the Medical Research Council of Great Britain is the perpetuation of a few consolidated grants (a type of block grant which constitutes a continuous and primary annual charge on its resources), and the appointment of research associates which, in some ways, correspond to the external staff of the British MRC. The institution of research units or institutes, as carried out by the Defence Research Board, the National Cancer Institute, and the Ontario Cancer Treatment and Research Foundation in Canada, the Research Units in Great Britain, and the National Research Institutes at Bethesda by the National Institutes of Health, has demonstrated, as has been demonstrated in Canada by the Best Institute at Toronto, the Collip Department of Medical Research at the University of Western Ontario, and the Montreal Neurological Institute at McGill, that such organizations exhibit a maturity in programme, a splendid training-ground, and a continuity in productivity which are hard to match by a programme of annual grants to scientists in university laboratories. The Medical Research Council might well consider developing such institutes, which should be established in universities, where they may participate in the graduate training programmes and receive the advantage of contact with teaching departments and clinical experiences.

Research in medicine has spread from thebasic science laboratory to the laboratory in the hospital and to the ward. Clinical investigation units are springing up as more full-time faculty appointments are made in the clinical fields. Such a unit requires hospital beds segretated for investigation of patients, special dietary departments and laboratories, nursing and technical aid, i.e., a capital and maintenance support preliminary to the support of specific investigations. Few exist in Canadian hospitals; they arose first in the DVA hospitals, and should now be established in at least one hospital in each university centre. The Medical Research Council should be provided with funds and encouraged to follow the example of the National Institutes of Health of the USA, and provide for this essential method of investigating human illness.

From the universities and from societies and organizations whose members are active in research, there is a general plea for the implementation of the recommendation in the Farquharson Report, "That funds be made available for the construction of urgently needed research buildings and facilities in the medical schools of Canada, and affiliated institutions. It is estimated that 25 million dollars is required now for this purpose by the medical schools, and 12 million dollars for research facilities in the affiliated teaching hospitals." This money might well

be funnelled through the Medical Research Council whose members are capable of assessing, with the help of the Association of Canadian Medical Colleges, the needs of each university. In the USA, the National Institutes of Health includes this programme in its functions, and, annually for the past six years, has included $30 million in its budget, "to assist in the construction and/or equipping of additional facilities for the conduct of research in the sciences relating to health ...... on a matching basis ...... not to exceed 50 per cent of the total costs".

An instrument recognized as vital in research is a library, liberally equipped with journals, books, reading rooms and capable staff. The report of the Universities Grants Committee of Great Britain, 1958, states: "A large part of the university expenditure for research of all kinds is expenditure on libraries." The libraries in all Canadian medical schools are undernourished; in some cases so poorly equipped and situated as to discourage use. The Medical Research Council could assist research in all fields if it were to consider and implement some plan of aiding their libraries.

At the time of the writing of this Report, the Medical Research Council still operates under the aegis of the National Research Council, while steps are being taken to prepare for its separate incorporation. Its membership is composed entirely of professional men active in medical education or in practice. Such persons might have an interest, direct or indirect, in the grants which the council makes for research or for training. In the opinion of this group, it would be advantageous if, in the establishment of the Medical Research Council, there be made provision for the inclusion of non-scientific members, public-spirited citizens of some distinction whose advice would be helpful. This pattern is already followed by the National Research Council, on whose membership there have been as many as three not connected with universities. It is also followed by the National Institutes of Health (USA.) and by the Medical Research Council of Great Britain.

Under the National Institutes of Health each division (including the Division of Research Grants) has an Advisory Council which includes, as well as leading scientists, well-informed public-spirited citizens. The chairman of the Council is the surgeon general of the public health service. An application for a research grant is referred to a study section, made up of scientific experts in the particular field, for review and recommendation. The Advisory Council reviews the recommendations of the study section and recommends in turn to the surgeon general, who, however, may not approve the recommendation of the Council.

In Great Britain, one quarter of the members of the Medical Research Council are not in the universities nor are they medically qualified. While the chief executive officer, Sir Harold Himsworth, is a distinguished medical scientist, the chairman has invariably been a prominent layman.

The advantage to the Medical Research Council of such an arrangement would be that not only would the chairman be completely objective in his duties, but could go to the Treasury Board to press for a budget for the Council as one who has no financial or professional interest in the budget for which he makes an appeal.

CONCLUSIONS

1. That the Department of National Health and Welfare, the Defence Research Board and the Department of Veterans Affairs be encouraged to continue their programmes of extramural research, within their own special fields of interest.
2. That in the Department of National Health and Welfare, the intramural research projects be reviewed and assessed periodically by experts not on the professional staff of the Department.
3. That the Department of National Health and Welfare arrange to simplify the procedures in the award of intramural grants in aid of research, and in the accounting related to the awards, after the pattern adopted by the Medical Research Council.
4. That the Government of Canada regard the Medical Research Council as its principal adviser and chief instrument in the support of its research programme in medicine.
5. That in the Act of Incorporation of the Medical Research Council, there be made provision for the inclusion among the members of public-spirited non-scientific persons, one of whom would be appointed Chairman.
6. That the operating budget of the Medical Research Council be increased liberally and progressively, by an amount which will enable it to expand its current programme and offer additional means of support of research. An annual increment of $2 million for the next five years is proposed.
7. That, in addition to an increase in its operating budget, the Medical Research Council be provided with funds sufficient to make capital grants for the erection and equipping of essential research facilities, in the universities and affiliated hospitals, the details to be determined by the Medical Research Council in conference with the Association of Canadian Medical Colleges.[1]
8. That the Medical Research Council be encouraged to increase the number of research associates and medical research fellowships for appointments in the medical schools.
9. That the Medical Research Council, Department of National Health and Welfare and the Defence Research Board make available, in operating research grants, items for the support of the medical library in the institution from which the applicant comes.
10. That the Medical Research Council include, in each grant, an allowance to the institution at which the grantee is employed, to assist in the indirect cost of administering the grant. (Agencies which now carry out this practice set the allowance as a percentage of the indirect cost of the grant – e.g., the National Institutes of Health allows up to 20 per cent.)

[1] On November 26, 1962, representatives of the Association of Canadian Medical Colleges, and of the Canadian Universities Foundation, were received by the Honorable Gordon Churchill, Chairman of the Committee of the Privy Council on Scientific and Industrial Research. They presented him with details of the building programmes of the medical schools (and of the projected medical school at Sherbrooke, Quebec) and their affiliated teaching hospitals. The estimated cost of these, in the period 1963 to 1971, is $190,434,633; the research component is estimated to be $58 million.

The Canadian medical scientists are heritors of the practices of medical education and research from Britain, continental Europe and the North American continent. They are in an enviable position to select the best from each: the Latin vivacity, the German and Scandinavian meticulous persistence, the British practice of unhurried thoroughness, and the enthusiastic American demand that the scientist be provided with every assistance which can facilitate his researches. Canada can accept the American philosophy that research in medicine done anywhere can assist mankind, and should therefore be supported by its government wherever good men need help, but is not yet able to make grants to foreign scientists. Indeed, it has not yet made sure that its own people are supported. Surely it is time to recognize that frustration means discouragement and waste of talent, that Canadian medical science can neither justify its early history, nor open the doors to the brilliant discoveries within its capacities, without the sympathy and generous support of those in whom we place the responsibility of government.

> "Of what use is the barren cow, which gives no milk? Of what use is the King's Grace if he does not fulfil the hopes of suppliants?"[1]

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[1] Tenth Century Indian aphorism.

CHAPTER 11

MEDICAL MANPOWER — REQUIREMENT AND SUPPLY

INTRODUCTION

What is the future requirement of physicians that Canadian medical education must strive to meet? Several possible levels of requirements have been deduced by Judek[1] from data available up to mid-1963. The different estimates represent possible variations in rate of growth of the Canadian population in the 30-year period following the Census of June 1, 1961. They reflect also the probable requirement of relatively larger numbers of physicians in proportion to the population. This would be to meet changing patterns in medical care including more complete coverage of the population than hitherto. For the purpose of this chapter the manpower requirement for physicians has been reduced to two specific targets in order to present the challenge of needed expansion in concrete terms. Target 1 is to increase the supply of physicians at the rate of growth of the population — "holding the line". Target 2 is to improve slowly but steadily the proportion of physicians in the population.

With minor variations the data collected by Judek and his method of computing physicians supply, along with material and method from an earlier survey by Clarkson,[2] have been used to derive the projections of medical school output that follow. For the convenience of those who must deal with the actual mechanics of expansion of educational facilities much material from the Judek report is reproduced here, some of it rearranged or set forth in greater detail. In several instances a further refinement of premises has been made in the interest of practicality. To take such a step makes it all the more necessary to re-examine periodically the assumptions of immigration and population growth on which the projections of physician requirement have been made. Similarly, the estimates of physician supply will require correction in the light of emerging information on medical school output, on the immigration of physicians, and on the several

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[1] Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964.

[2] Clarkson, G.C., "Future Requirements for Physicians in Canada", *Canadian Medical Association Journal*, 85:1162—1169, November 18, 1961. Included as Appendix in Submission of the Canadian Medical Association to the Royal Commission on Health Services.

factors that diminish the size of the active work force. The latter include losses by death, retirement and emigration. New predictions may then be made from the data available in Chapter 8 of the Judek report and in the following sections of this chapter.

This chapter deals with the numerical aspects of the output of physicians by existing and future medical schools. The universities and hospitals that undertake to expand their activities or to create new facilities must be careful, however, to ensure quality as well as quantity of output; the public, no less than the medical educators, are alert to standards of quality. Chapter 12 will suggest how new educational arrangements may lay the groundwork for the most appropriate quality of performance by their graduates. Morever, although attention is directed to the supply of physicians, it is assumed that the training of other health personnel will be regarded as an important obligation of the modern university health sciences centre. How many physicians will Canada require in 1966, 1971, and on to 1991, and what will this mean in terms of the expansion of existing institutions and the founding of new ones? Before examining the premises on which such a question must be based it is well to refer briefly to the variable factors that influence the demand for physicians in relation to their supply. Most of these are discussed in greater depth and detail in other reports to the Commission[1] and in Chapter 12 of this study.

FACTORS TENDING TO INCREASE THE DEMAND FOR PHYSICIANS IN CANADA

These will be named and several will be dealt with at greater length when projections are attempted.

1. The growth in population because of natural increase and immigration.
2. The increased demand for health services in order to raise the standards of health care to extend services to all segments of the population.
3. The need of an increasing number of medical scientists to advance research and to translate its findings into practice.
4. The probability that an increasing proportion of medical graduates will take additional years of post-graduate training, thus delaying their time of arrival in their full professional role.
5. The net loss of physicians from emigration, chiefly to the United States.
6. The tendency (suspected but not proved) for physicians to retire earlier than some decades ago.
7. The mounting interest in aiding the development of the new nations and improving the health and welfare conditions in some of the older nations. (This is not necessarily related to the presence of 10 – 14 per cent of students in Canadian medical classes from other countries.)

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[1] Judek, S., *op. cit.* See also the briefs submitted by the various health professions.

FACTORS TENDING TO INCREASE AND CONSERVE THE SUPPLY OF PHYSICIANS IN CANADA

The major factors appear to be:

1. The steps being taken to increase the efficiency of recruiting, selecting and teaching medical students.
2. The expansion of training facilities by means of suitable enlargement of the present 12 medical schools and the founding of new ones.
3. The immigration of physicians, including facilitation of entry of those in categories that are in short supply in Canada.
4. The developments in medical practice that conserve the time and effort of physicians.
5. The programmes in health education that foster better understanding of the purposes of good health care and the benefits to be derived from health services that are effective but not wasteful.

REQUIREMENT

POPULATION PROJECTIONS FROM 1961 TO 1991

The first variable to consider is the rate of change in the population.[1] In the 60 years from 1901, Canada's population has grown from 5.4 to 18.2 millions. The 1961 figure should be nearly doubled in a further 30 years if immigration exceeds emigration by 50,000 a year. Table 11–1 shows the extent to which the population from 1966 to 1991 may vary depending on levels of net immigration between 0 and 100,000 annually. It would make a difference in 1991 of 4.5 million people depending upon whether one took the highest or lowest rates experienced in recent years.

TABLE 11–1

PROJECTED TOTAL POPULATION OF CANADA, 1966–1991
BASED ON POPULATION OF 18,238,247, JUNE 1, 1961, CANADIAN CENSUS
AT FIVE POSSIBLE LEVELS OF NET IMMIGRATION

Net immigration at annual rate of:	1966	1971	1976	1981	1986	1991
		(as at June 1 in thousands)				
0	20,021.5	21,983.8	24,253.6	26,858.5	29,714.9	32,785.9
10,000	20,076.6	22,105.0	24,449.6	27,136.1	30,081.0	33,250.1
25,000	20,159.0	22,286.7	24,743.5	27,552.6	30,630.4	33,946.3
50,000	20,296.5	22,589.5	25,233.5	28,246.7	31,545.9	35,106.7
100,000	20,571.3	23,195.3	26,213.2	29,635.0	33,377.0	37,427.5

Source: Report of Royal Commission on Health Services, Vol. I, Ottawa: Queen's Printer, 1964.

[1] Data used in this discussion have been drawn from material appearing in the *Report of the Royal Commission on Health Services*, Vol. I, Ottawa: Queen's Printer, 1964.

Fluctuations in immigration have led to the use of quite different formulae when computing the growth of population in order to estimate the number of physicians required in the future. Based on the experience of the 1950's it was logical for Clarkson[1] to use levels of net annual immigration of 75,000 and 100,000 when projecting population trends and the requirements for physicians in Canada on behalf of the Canadian Medical Association. It was noted that the population in 1960 exceeded by 164,000 the highest projection of the Royal Commission on Canada's Economic Prospects. In the light of more recent experience it seems reasonable to use a level of 50,000 net annual immigration. It appears, however, that the net immigration for 1961 and 1962 was practically nil; and the rate for the first quarter of 1963, if sustained, will yield a net gain for the year of about 25,000 immigrants.[2] The effect of this recent decline is not incorporated in the projections that follow.

THE PHYSICIAN-POPULATION RATIO

In the 1961 Canadian Census one physician was reported for every 857 of (or 116.7 physicians per 100,000), the ratio used as a baseline in studies made for the Commission.[3] The significance of this index and its variations across Canada have been set forth fully by Judek. Because it is so widely used to measure the adequacy of physician supply, and will be an important premise in the projections to follow, it is necessary to stress the limits of its usefulness. In 1901, Canada had one physician for every 972 persons but 50 years later only one for 976;[4] a shortage of 800 physicians by the earlier ratio. Nevertheless, because of many technical and socio-economic advances, it is probable that in 1951 better medical care was being provided, and to a larger proportion of the population too. Again, during World War II, in March 1943, 25 per cent of Canada's active work force of physicians was in the armed services.[5] The civilian population was then served by one doctor per 1,177 persons (including in this count 6.6 per cent retired physicians). It is common knowledge that although civilian populations in many countries experienced considerable inconvenience in wartime due to the reduced availability of physicians (by as much as 40 per cent withdrawn from community service in the USA), this disadvantage was not reflected in morbidity and mortality rates. Again, when these doctors returned in large numbers to civilian practice a corresponding improvement in health, at least by these gross indices, could not be demonstrated.

Similar comparisons of the physician-population ratio between countries and between parts of a country cast doubt on its usefulness as an index of the

[1] Clarkson, *op. cit.*

[2] Data supplied by Dominion Bureau of Statistics.

[3] The count at Census on June 1, 1961, was 21,290 physicians. The number listed by Canadian Mailings Limited in October of that year was 20,981, which included 553 junior interns and 1,981 senior interns and residents.

[4] Judek, *op. cit.*, Table 2—1 (census data).

[5] Report of the National Health Survey conducted by the Canadian Medical Procurement and Assignment Board, Ottawa, 1945, p. xxi.

health of a community. Nor is there a specific ratio above which it can be said that a community is probably receiving adequate medical care but below which it is probably being deprived. For example, Massachusetts and New York have the most favourable physician-population ratios among in the United States but their mortality rates are among the highest. On the other hand, Idaho, North Carolina and North Dakota have extremely unfavourable physician-population ratios and yet death rates well below average.[1] These variations reflect great differences between populations in terms of age spread, socio-economic status and patterns of living. In Canada, the physician-population ratio in 1960 was 1:879 (113:7 per but the spread by provinces was from 1:780 (128.2 per 100,000) in Ontario to 1:1,682 (59.5 per 100,000) in Newfoundland.[2] Judek shows how the supply of physicians by provinces varies directly with the level of per capita income (from a low of $877 per capita to a high of $1,784); also with the proportion of the population living in urban communities (from 32 per cent to 77 per cent).[3] The three provinces with the smallest supply of general hospital beds (range for Canada 3.7 to 7.3 per 1,000) were in the bottom bracket for per capita income also and had inferior physician-population ratios. Since each of these factors contributes to the efficiency of health services it becomes unwise to attribute a particular health record to any single factor, even the supply of physicians. By the same token, to make up only one of several deficiencies might yield only partial improvement in health status.

Instances of professional crowding have occurred no doubt in individual cities or in particular specialties but no region or province or state in North America has ever admitted having too many doctors. Recent surveys to estimate future needs have argued for a holding of the ratio at its current level as the minimum target, either implying or recommending explicitly that if possible it be improved to meet the demand for increasing services, increasing technical development, etc. The Surgeon General's Consultant Group on Medical Education, USA, estimated in 1959[4] a ratio of 140.7 physicians (Doctors of Medicine and Doctors of Osteopathy) to 100,000 of population (1:711).[5] To maintain this ratio in 1975 would require almost a 50 per cent increase in graduates from the medical schools of the USA. Recognizing the physician-population ratio as a very crude index of adequacy of supply nervertheless "the challenge presented by just maintaining the present ratio over the next 15 years is of such magnitude that it would be of little help to develop a more sophisticated index".[6]

A survey of the 13 western states of the USA revealed an over-all average of 137 physicians (excluding doctors of osteopathy) per 100,000 in 1957 compared

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[1] Medical Education and Research Needs in Maryland. Committee on Medical Care, Maryland State Planning Commission, Baltimore, Jan. 1962, p. 16–17. (Table A, App. II, from Vital Statistics – Special Reports, National Summaries, Vol. 52, No. 7, August 24, 1960.)

[2] Judek, *op.cit.*, Table 2–3.

[3] *Ibid.*, Table 2–4.

[4] U.S. Department of Health, Education & Welfare, *Physicians for a Growing America*. Public Health Service Publication No. 709, Washington: U.S. Government Printing Office, 1959.

[5] Excluding osteopathic physicians the physician-population ratio was 133 per 100,000 (1:752).

[6] U.S. Department of Health, Education & Welfare, *op. cit.*

with a rate of 142 two years previously.[1] It was recommended that each state in co-operation with the others "take all steps necessary at lest to maintain its existing ratio of physicians to people". Incidentally, to produce an additional 500 graduates a year for this region its nine medical schools were urged to expand their output by 25 per cent, and three additional schools, or their equivalent, were recommended. A recent study from California finds it "desirable for the State to attempt to maintain the 1959 physician-population ratio of 174 or 175 per 100,000" (1:571).[2] It admits, however, that during the next two decades it will probably fail to do this.

In Canada, the census figures for the first half of this century reveal first a relative decline in the supply of physicians (from 1:972 in 1901 to 1:1,034 in 1931) followed by an improvement, particularly between 1951 and 1961 (from 1:976 to 1:857).[3] During that decade the population increased by 29.1 per cent but the number of physicians rose by 43.3 per cent. On an annual basis the rate of improvement in medical manpower was over 1 per cent. This was due in the main to graduates from abroad who comprised 35 per cent of the new physicians in Canada in the eight years 1953–1960. During this time there were 6,874 graduates of Canadian medical schools (6,187, after deducting 10 per cent for non-residents) and 3,370 immigrant physicians, both before licensure.[4]

In projecting the future requirement to 1980, Clarkson used two alternative approaches to the physician–population ratio, (1) continuation at the December 1960 estimate of 1:879 (113.7 per 100,000) and (2) a continual improvement of the ratio by one-half of 1 per cent (9.5 per cent) per annum to reach a ratio of 1:795 (125.8 per 100,000) in 1980. In the current study Judek has computed the rate of change in the ratio after exclusion of the improvement due to immigrant new registrants.[5] On this basis the rate of improvement over the ten-year period 1950–1960 equals a compound rate of 0.85 per cent per annum. Further improvement of physician supply at this rate yields ratios increasing from 1:857 (117.6 per 100,000) in 1961 to 1:822 (121.6 per 100,000) in 1966 and on to 1:665 (150.4 per 100,000) in 1991.

In summary, looking at the output of Canadian medical colleges in relation to future requirements, the physician-population ratio may be used as a crude descriptive index of the medical manpower of the country as a whole at a particular time. Changes in the ratio from year to year will give a clue to trends in the supply of physicians in relation to numbers of population. One cannot conclude from changes in the ratio that needs are being met, or are not being met. Whether the supply of physicians is inadequate, sufficient, or over-abundant, cannot be judged in isolation from a consideration of such factors as the supply

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[1] *The West's Medical Manpower Needs.* The Western Interstate Commission for Higher Education, Boulder, Colo., 1959.

[2] *Medical Education in California.* Coordinating Council for Higher Education, State of California, Sacramento and San Franciso, 1963.

[3] Judek, S., *op.cit.*, Table 2–1.

[4] Clarkson, G.C., *op.cit.*, Table 5.

[5] Judek, S., *op.cit.*, Appendix 8–1, Footnote.

of hospital beds of various types, the financial resources of families, the degree of urban development and of regional organization of health facilities and – of special importance – the geographical distribution of the physicians themselves.

Of even greater significance to those responsible for influencing the supply of physicians is their distribution in terms of professional division of labour. Are there enough family doctors, neurosurgeons, clinical pharmacologists, hospital administrators, epidemiologists and all the others? Before one can develop norms for this type of distribution it will be necessary to know much more than the gross numbers in the various categories of professional role, including also the allied professions and auxiliary personnel. Data of this sort collected periodically will have to be correlated with all the variants mentioned above and many others, e.g., variations in the age groupings, occupation and patterns of utilization of physicians' services in different communities and social groups. The most important correlation would be with such measurements of quality of care or service as may be developed in the future. One hopes that in addition to a battery of objective methods of assessment there will be opportunities regularly to sample the impressions of those who receive and those who provide such services. In no field other than health, unless it be education, is it more important to interpret statistical findings in the light of human reaction and individual judgement.[1]

PHYSICIAN REQUIREMENTS PROJECTED FROM 1961 TO 1991

This topic is treated fully by Judek[2] but certain of the data will be reproduced here to explain the basis of an additional projection used and to emphasize the order of magnitude of the deviations that result when the factors of immigration and physician-population ratio are altered.

Based on the presence of 21,290 physicians in the population of 18,238,247 in Canada on June 1, 1961, forecasts of the number of physicians required at five-year intervals to 1991 have been made. Two sets of variables have been used, immigration and the physician-population ratio. From Table 11–1 have been taken the levels of population expected to result should the annual net immigration be 25,000, 50,000 or 100,000 levels present at one time or another in recent Canadian experience. Table 11–2 lists the number of physicians required in 1966, 1971, 1976, 1981, 1986 and 1991 at each of these immigration levels if

[1] A minor step towards making the best use of the physician-population ratio is to express the number of physicians in relation to a large block of population, e.g., 117 physicians per 100,000, as well as or instead of 1:857. There is a semantic hazard to equating one mythical physician to 500 or 1,000 people. It is too easy to think of the personal service to be rendered by one doctor to a certain number of potential patients. Even the solo doctor is a member of a larger team. The supply of the other clinicians with whom he collaborates and of the uncounted colleagues in teaching, research and administration is equally important to the maintenance of good medicine. Their numbers must be counted; all to be included in a common total. Thus the medical manpower of a country, or in this case even its smaller sub-divisions, could more meaningfully be described as such and such numbers of general physicians or specialists, full-time or part-time, young or old, urban or rural, in training, active or retired, per 100,000 (or in some cases per million) of population.

[2] Judek, *op. cit.*, Chapter 8.

(a) the physician-population ratio of June 1, 1961, is maintained, namely, 1:857, or 116.6 physicians per 100,000 of population; and if (b) the ratio is improved annually at a compound rate of 0.85 per cent per annum.

The effects of (a) variations in population growth due to different assumptions about net immigration and (b) increasing very slightly the physician-population ratio, together produce estimates of future numbers of doctors required that are quite far apart. Whereas the two estimates that are closest together for 1966 have a difference of only 160 physicians, the estimates that are farthest apart in 1991 yield a variation of 18,025 physicians, nearly 50 per cent! Even as early as 1981 the high and low projections for population are nearly three million apart. In addition, when the population is 28,246,700 if one changes from a physician-population ratio of 1:774 to 1:775 then the increase in number of physicians required is 47, equivalent to the output of one of the smaller medical schools' For the practical purpose of planning new training facilities it is obvious that a much narrower range of possibilities must be selected. Nevertheless if a concrete objective is established one should not forget the tentative nature of the premises from which the objective was derived.

TABLE 11–2

THE NUMBER OF PHYSICIANS REQUIRED IN CANADA AT FIVE-YEAR INTERVALS, 1961–1991, BASED ON PROJECTIONS OF POPULATION FROM THE 1961 CENSUS AT ANNUAL NET IMMIGRATION LEVELS OF 0, 25,000, 50,000 AND 100,000

(a) maintaining the physician-population ratio at the 1961 level of 1:857 (116.7 physicians per 100,000)

(b) increasing the ratio by 0.85 per cent per annum to 1:665 (150.4 per 100,000) by 1991

Year	Physician-population ratio	Number of physicians required at four levels of net annual immigration			
		0	25,000	50,000	100,000
		(a) constant physician-population ratio			
1961	1:857	21,290	21,290	21,290	21,290
1966	"	23,362	23,522	23,683	24,003
1971	"	25,652	26,005	26,358	27,065
1976	"	28,300	28,872	29,443	30,587
1981	"	31,340	32,150	32,959	34,579
1986	"	34,673	35,741	36,809	38,946
1991	"	38,256	39,610	40,964	43,672
		(b) improving physician-population ratio			
1966	1:822	24,357	24,524	24,691	25,025
1971	1:787	27,933	28,318	28,714	29,473
1976	1:755	32,123	32,772	33,421	34,719
1981	1:723	37,148	38,108	39,068	40,988
1986	1:693	42,878	44,199	45,520	48,163
1991	1:665	49,302	51,047	52,792	56,281

Source: Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, Chapter 8.

We may relate speculation on the future supply of physicians to two arbitrarily selected targets or levels of requirement. In view of the wide swings in net immigration into Canada, a middle-of-the-road objective seems to be the needs of the Canadian population augmented by a net immigration of 50,000 annually. The minimum goal at this level of growth would be the maintenance of the physician-population ratio at the 1961 level of 1:857. *Target 1*, therefore, is a census-type count of physicians in Canada on June 1 at five-year intervals as follows:

1966 – 23,683	1981 – 32,959
1971 – 26,358	1986 – 36,809
1976 – 29,443	1991 – 40,964

The second goal represents an improvement in the physician-population ratio to permit elevation of the standards of services and their extension more uniformly to all regions and segments of society. This goal should be realistic from the standpoint of adding appreciably to the efficacy of the medical work force but also in relation to conceivable degrees of expansion of the country's training facilities. It is on the latter score that the estimates listed in Section (b) of Table 11–2 seem unrealistic. Again arbitrarily, a compromise objective was sought midway between *Target 1* as defined and the physician counts required to improve the ratio at a compound rate of 0.85 per cent annually. *Target 2*, therefore, represents the median value between the minimum and maximum estimates of physicians required to serve the population expanding at an annual net immigration of 50,000. If achieved, the following levels of physician supply would be attained and the physician-population ratio would be improved as indicated.

1966	24,187	1:839	(119.1 per 100,000)
1971	27,536	1:820.3	(121.9 " ")
1976	31,432	1:802.8	(124.5 " ")
1981	36,013	1:784.3	(127.4 " ")
1986	41,164	1:766.3	(130.4 " ")
1991	46,878	1:748.9	(133.5 " ")

This represents a slightly greater requirement of physicians than that postulated in the projections made for the Canadian Medical Association in 1961, based on pre-census data.[1] It would require by 1991 approximately the supply of physicians (excluding osteopathic physicians) enjoyed by the United States thirty years earlier. *Target 1* parallels the CMA median projection (calculated graphically), being about 700 above it in 1966 and identical by 1981. *Target 2* runs parallel to, and from 600 to 800 above, the CMA maximum.

Further support of the validity of the estimates derived for *Target 1*, which was based on the physician-population ratio, has been derived from an entirely different body of evidence.[2] The survey of Canadian physicians in Canada in 1961 indicated that the total annual volume of medical services

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[1] Clarkson, *op.cit.*

[2] Judek, *op.cit.*, Chapters 5 and 8.

supplied by an estimated 15,450 physicians in private practice in Canada that year amounted to 97,891,200 patient-visits. Working out the weighted weekly average patient-visit load per doctor of all types, in private practice, it was concluded that the average annual patient-visit load was 6,336 per physician; and that there were 5.3784 physician-visits per capita, irrespective of age, sex, income and location. Adopting these ratios, and assuming that private practitioners will continue to comprise 72.5 per cent of total medical manpower, it is possible to estimate the number of physicians required in the future to serve the growing population. The results of this computations are remarkably close to the physician requirements for 1966–1991 designated as *Target 1.* The comparison is forth in Table 11–3.

TABLE 11–3

PROJECTED FIVE-YEAR REQUIREMENTS OF PHYSICIANS, CANADA, 1961–1991

A net annual immigration of 50,000 is assumed, projections are compared when derived

(a) from a constant physician-population ratio maintained at 1:857, and

(b) from a constant volume of medical services maintained at 5.3784 physician-visits per capita per annum.

Year	Number of physicians required at five-year intervals		
	(a) constant physician-population ratio (Target 1)	(b) constant volume of medical services	Excess of (b) over (a)
1961	21,290	21,290	—
1966	23,683	23,764	81
1971	26,358	26,448	90
1976	29,443	29,545	102
1981	32,959	33,071	112
1986	36,809	36,935	126
1991	40,964	41,104	860

Source: Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, Table 8–2.

Judek has calculated on the same basis also the physician requirement if the volume of medical services required were to be increased by 25 per cent to 6.7230 physician-visits per capita. The results[1] express a very much higher requirement than that shown in Table 11–2, Section (b), which was based on a steadily improving physician-population ratio. For example, the projection for 1971 based on increasing volume of services is 33,060 physicians. The corresponding level based on the improving physician-population ratio is 28,714, whereas *Target 2* and *Target 1* values are 27,536 and 26,358 respectively.

[1] *Ibid.*, Table 8–2.

It may well be that the assumption of a 25 per cent over-all increase in volume of services is unrealistic. In any case, the further elaboration of this additional method of computing the physician requirement may be useful in future studies.

THE SUPPLY OF PHYSICIANS

The most important component in the supply of physicians for Canada is the output of medical graduates by Canadian universities. It is also the one that lends itself most readily to modification. Next in significance is a favourable balance between the immigration and emigration of physicians which depends upon factors mostly beyond control. Of particular importance in this connection is the migration of Canadian physicians to the United States. Its precise magnitude is not known nor is the relative weight of the factors that stimulate this movement fully understood. The present report includes some speculation on these questions with full realization that definitive judgements must await the collection of more detailed information in the years ahead. Of similar uncertainty is the pattern of retirement of physicians which bears on the effective size of the physician work force. But first to be considered is the supply of graduates in medicine from Canadian universities.

THE OUTPUT OF CANADIAN MEDICAL SCHOOLS

On what should the count be based – the number of graduates, interns or licentiates? Confusion arises in Canadian medical education statistics because of variations in the time at which the M.D. degree is conferred. For example, in 1962 there were 849 recipients of the M.D. degree. Of these, 587 had completed the fourth year in the nine universities giving the four-year medical course. The other 262 had completed the fifth year in the three universities in which the undergraduate internship prevails.

The first group will be eligible for licence to practise at the end of 1962–63, after completing one year of post-graduate internship. The second group was eligible to practise in July 1962 because of completion of the internship in the fifth undergraduate year.

Since in all internships, whether post-graduate or undergraduate, a substantial amount of medical service is rendered, and since there is advantage in having uniformity of method in reporting the addition each year to the physician work force, it is proposed that the number reported be all those who have completed successfully the fourth year of the course and are ready to enter internship, irrespective of whether a degree is granted at that stage or a year later.[1]

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[1] Over a five-year period, 1956–57 to 1960–61, the failure-rate at the end of the fourth-year class, and of the fifth year class in the three universities with an undergraduate internship, was negligible. In two of the latter there were no failures in either class in the five-year period. In the third institution one student in 520 failed at the end of the fourth year, and one in 532 at the end of the fifth year. No significant error will result, therefore, from considering the output of Canadian medical schools to be, in effect, the total number of students who have completed the fourth year in either type of course. This also, permits useful comparison with the vast experience of the medical schools of the United States of which 84 in 1962 had 7,168 graduates.

A unique assembly of information on Canadian medical students and graduates to the year 1960–61 is available in the chapter devoted to that topic in Medical Manpower in Canada.[1] Data on registrations in all the medical years for 1961–62 and 1962–63 may be found in the annual returns made by the deans of medicine to the Association of Canadian Medical Colleges, shown in Table 11–4. By applying attrition rates appropriate to the year of the course, or to the course as a whole, one can make reasonably accurate predictions of Canadian output up to June 1966. The rates used are the average failure rates for 1956–57 to 1960–61, a period when a shortage of applicants led to the acceptance of some less well prepared students than was the case earlier and again more recently. For first-year students the rate was 9.7 per cent, for second, 3.8 per cent, third, 1.1 per cent and fourth, 0.1 per cent.[2]

PREMISES ON WHICH FUTURE OUTPUT OF CANADIAN MEDICAL SCHOOLS IS ESTIMATED

The following assumptions have been made in constructing Table 11–6 which indicates the intake of medical students by Canadian faculties to 1977–78 and the numbers for admission to internship up to 1981.

1. Continued improvement in the supply of qualified applicants for medicine. There was a 17 per cent increase in the number of applicants in 1962 over the previous year.[3] The number registered in first-year was increased in 1962 for the third successive year (Table 11–4).
2. Better methods of coping with drop-out around the time of registration. The composite official first year class size in 1961–62 was 1,022 but only 1,006 were registered. The discrepancy was due almost entirely to the drop-out of accepted applicants shortly before registration. Unexpected vacancies in any school could be filled at short notice from a small pool of "stand-by" applicants.
3. Enlargement of medical student classes in the present 12 medical schools. By stretching resources but without major additions to facilities the deans of medicine indicated to the Commission that they could increase their effective first-year class size by 125[4] (Table 11–5). In 1962–63, a registration of 1,057 was attained. It is assumed that by 1965–66 this will have reached 1,147.
4. Gradual reduction of attrition in medical studies so that 90 per cent of those who start will graduate, instead of 85 per cent.

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[1] Judek, S., *op. cit.*, Chapter 3.

[2] *Ibid.*, Table 3–15. See also Chapter 3 of this study, Tables 3–7 and 3–8.

[3] Macleod, J.W., "Medical Student Enrolment in Canadian Universities," *Canadian Medical Association Journal*, 88:683–690, April 6, 1963, Table 3.

[4] Questionnaire completed for Medical Education Project; see also, *The Association of Canadian Medical Colleges* brief submitted to the Royal Commission on Health Services, Toronto, May 1962.

TABLE 11–4

MEDICAL STUDENTS IN CANADA ANNUALLY, BY YEAR OF COURSE AND SEX, 1957–58 TO 1962–63[1]

Year of Course	1957–58			1958–59			1959–60			1960–61			1961–62			1962–63[2]		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
1st.........	1,011	925	86	989	898	91	946	861	85	970	870	100	1,006	890	116	1,057	938	119
2nd.........	914	845	69	911	830	81	882	804	78	842	766	76	857	769	88	904	812	92
3rd	928	870	58	869	802	67	863	784	79	853	775	78	808	729	79	831	747	84
4th	830	784	46	903	848	55	858	794	64	843	767	76	854	777	77	805	736	69
Total......	3,683	3,424	259	3,672	3,378	294	3,549	3,243	306	3,508	3,178	330	3,525	3,165	360	3,597	3,233	364

[1] Excluded are pre-medical students (Queen's and Toronto) and fifth-year undergraduate interns (Dalhousie, Laval and Montreal).

[2] Subsequent cross check revealed errors in one medical school's returns.
The revised report on enrolment for 1962–63 is as follows:

Year of Course	*Total*	*Male*	*Female*
1st	1,061	941	120
2nd	900	805	95
3rd	813	730	83
4th	796	723	73
Totals	3,570	3,199	371

Source: Macleod, J.W., "Medical Student Enrolment in Canadian Universities", *Canadian Medical Association Journal*, 88:683–690, April 6, 1963, Table 1.

5. The opening of a new medical faculty at the University of Sherbrooke is postulated in the projections of supply of physicians in this report.[1]
6. The return of ten per cent of graduates of Canadian medical colleges to their home countries.

TABLE 11–5
SUMMARY OF DATA ON EXPANSION OF FIRST-YEAR MEDICAL CLASS IN 12 CANADIAN UNIVERSITIES

Registrations 1961/62 and 1962/63; official class size and additions possible with present facilities

University	Official class size 1961/62	Intake 1961/62	Additions proposed	New class size	Intake 1962/63	Excess or Deficit
Dalhousie	67	66	5	72	71	– 1
Laval	125	128	25	150	133	–17
Montreal	120	124	–	120	126	+ 6
McGill	116	109	–	116	112	– 4
Ottawa	72	68	13	85	71	–14
Queens	64	60	5	69	59	–10
Toronto	150	152	25	175	175	0
Western Ontario	60	60	–	60	60	0
Manitoba	72	63	8	80	70	–10
Saskatchewan	40	39	20	60	40	–20
Alberta	76	76	15	91	78	–13
British Columbia	60	61	10	70	62	– 8
Total	1,022	1,006	126	1,148	1,057	–91

Source: Reports by Deans of Medicine to the Royal Commission on Health Services, Questionnaire, 1961/62. Also brief submitted by Association of Canadian Medical Colleges, 1962, to the Royal Commission on Health Services.

NECESSARY STEPS TO ENSURE MAXIMUM OUTPUT OF MEDICAL SCHOOLS

Some of the above conditions are based on the following suppositions which have a reasonable likelihood of fulfilment:

1. Further growth of interest in newer methods of teaching;
2. Reduction of the financial handicap of students of medicine;
3. Expansion of teaching, research and administrative staff as indicated in other parts of this report to be necessary, and
4. Some measure of solution of the financial problems facing universities that possess medical faculties now or may be induced to develop them.

[1] Projection B, Table 11—11 assumes receptions of 40 students in first professional year in 1968-9 and 48, 56 and 64 thereafter. This has been adjusted in Table 11—13 for opening in 1967-8 with 40 students; 50 and 64 thereafter. This should release 36 to intern-class in 1971; 45 and 58 thereafter.

The importance of doing the utmost to improve efficiency in all phases of the educational process is illustrated well by considering the difference in output of the medical colleges from that predicted in Table 11–6 if a greater attrition should prevail in undergraduate medical studies. If instead of a rate of 12 per cent for the classes entering in 1963 and 1964, and 10 per cent for the remainder of the 15-year period ending in 1977–78, the loss were 15 per cent, then the reduction in output

TABLE 11–6

ESTIMATED INTAKE OF MEDICAL STUDENTS IN CANADIAN UNIVERSITIES AFTER 1962-63 AND ESTIMATED OUTPUT BEGINNING 1963 WITH EXISTING FACILITIES OR PLANS

(Background data on intern classes of 1961 and 1962 also included to provide five-year totals similar to those used to calculate physician requirements)[1]

Intake[2] Admissions to medical school			Attrition rate in %	Output[3] Admissions to internship		
Year	Number	Five-year Total and Average		Year	Number	Five-year Total and Average[4]
1957-58	1,012		16.7	1961-62	842	*1961-62 – 1965-66*
1958-59	989	*1957-58 – 1961-62*	13.8	1962-63	853	T. 4,179
1959-60	946	T. 4,923	15	1963-64	804	(3,761)
1960-61	970	Av. 985	15	1964-65	825	Av. (752)
1961-62	1,006		15	1965-66	855	
1962-63	1,057		12	1966-67	930	*1966-67 – 1970-71*
1963-64	1,087	*1962-63 – 1966-67*	12	1967-68	957	T. 4,960
1964-65	1,117	T. 5,555	12	1968-69	1,009	(4,464)
1965-66	1,147	Av. 1,111	10	1969-70	1,032	Av. (893)
1966-67	1,147		10	1970-71	1,032	
1967-68	1,147		10	1971-72	1,032	*1971-72 – 1975-76*
1968-69	1,187[5]	*1967-68 – 1971-72*	10	1972-73	1,068	T. 5,348
1969-70	1,195	T. 5,943	10	1973-74	1,075	(4,813)
1970-71	1,203	Av. 1,189	10	1974-75	1,083	Av. (963)
1971-72	1,211		10	1975-76	1,090	
1972-73	1,211		10	1976-77	1,090	*1977-78 – 1980-81*
1973-74	1,211	*1972-73 - 1976-77*	10	1977-78	1,090	T. 5,450
1974-75	1,211	T. 6,055	10	1978-79	1,090	(4,904)
1975-76	1,211	Av. 1,211	10	1979-80	1,090	Av. (981)
1976-77	1,211		10	1980-81	1,090	

[1] Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, Chapter 8.

[2] Intake is measured by the number of students (premedical) admitted to first year of the four years of professional studies. The numbers below the dotted line are estimates.

[3] "Output" includes graduates of the nine medical colleges with a four-year course along with those who enter the undergraduate internship in the three with a five-year course.

[4] The bracketed figures refer to the output of Canadian medical schools less 10 per cent non-residents expected to leave the country.

[5] Enrolment at l'Université de Sherbrooke of 40 students was assumed for 1968/69, increasing by eight annually to 64 in 1971/72. This has been corrected in later calculations of output to allow for reception of 40 in 1967/68, 50 in 1968/69 and 64 thereafter (Tables 11–13 and 11–14).

would be nearly 900 graduates. This would be equivalent to the entire output of a medical school receiving a class of 68 annually for 15 years! In terms of cost of education this places in a more favourable light the relatively small financial outlay required to improve educational efficiency in all its aspects—better selection of applicants, reduced drop-out at registration and better results at promotion time due to improved methods of teaching and of evaluating students.

GRADUATES OF CANADIAN MEDICAL COLLEGES WHO COME FROM OTHER COUNTRIES

In the face of an upswing in the number of Canadian residents seeking entrance to medical studies, as well as an impending shortage of physicians in Canada, it is necessary to note the extent to which places in medical classes have been occupied by residents of other countries. Most of these are known to leave Canada after graduation. This group is to be distinguished from foreign-born Canadians who receive all or a portion of their higher education in Canada and who have no commitment or predisposition to make their professional contribution elsewhere. They complete for admission to medical college on the same basis presumably as do Canadian-born applicants.

In the period 1947-48 – 1961-62 Canadian medical degrees were awarded to 216 men and women whose country of residence at graduation was other than Canada.[1] Their distribution over three five-year periods was 37, 74 and 105 respectively when they comprised 5.5, 8.6 and 12.3 per cent of those graduating in medicine in Canada. This order of increase is explained by the large number of World War II veterans from 1946 to 1952, who were given preference in admission to medicine, and in later years by a shortage of candidates from among Canadian-born university students. That this trend towards an increasing proportion of non-Canadian medical students seems to be arrested is suggested in registration figures of the last six years, 1957-58 – 1962-63, as shown in Table 11–7.[2] The proportion fluctuates between 10 and 14 per cent, but what is striking is the steady decline in numbers of medical students from the United States and a comparable increase in numbers from Commonwealth countries. The first-year enrolment in 1962 sustains this impression. Non-Canadians comprised 11.8 per cent of the class (125 out of 1,057) – 6.3 per cent (67) from the United States, 4.8 per cent (50) from the Commonwealth and 0.7 per cent (8) from other countries.

The relevance of this to the supply of physicians in Canada lies in the belief that whereas almost all American students return to the United States upon graduation, or at least after internship, there is the likelihood that a number of the Commonwealth medical students who graduate from Canadian medical colleges desire to remain in Canada. The number of those who actually do so is not available. It is possible that pressure from an expanding number of Canadian

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[1] Judek, *op.cit.*, Table 3–4.

[2] Macleod, *op.cit.*

TABLE 11-7

GEOGRAPHIC ORIGIN OF FOREIGN STUDENTS IN CANADIAN MEDICAL SCHOOLS (First to Fourth Years), 1957/58 – 1962/63

Year	Total no. of foreign students	% of total enrol-ment	U.S.A.		Commonwealth Countries		Other Countries	
			No. of students	% of foreign enrol-ment	No. of students	% of foreign enrol-ment	No. of students	% of foreign enrol-ment
1957/58......	507	13.8	*	*	*	*	*	*
1958/59......	362	9.9	*	*	*	*	*	*
1959/60......	485	13.7	309	63.7	126	26.0	50	10.3
1960/61......	477	13.6	291	61.0	137	28.7	49	10.3
1961/62......	494	14.0	274	55.5	169	34.2	51	10.3
1962/63......	455	12.6	245	53.8	180	39.6	30	6.6

* Not available.

Source: Macleod, J.W., "Medical Student Enrolment in Canadian Universities," *Canadian Medical Association Journal*, 88:683, April 6, 1963.

applicants may lead to a policy of reducing the number of non-Canadians admitted to Canadian medical colleges. Any saving of manpower on this score is likely to be balanced, or even outweighed, by the increasing participation by Canadian physicians in overseas enterprises in the less industrialized nations. In the projections to be considered here it will be assumed that 10 per cent of the graduates of Canadian medical colleges are non-residents who will not be added to the Canadian physician population.

MEDICAL MANPOWER GAINS BY IMMIGRATION AND LOSSES BY EMIGRATION

Information on movements into and out of Canada is incomplete and what is available must be derived from a variety of sources – Census Division and Higher Education Section of the Dominion Bureau of Statistics, Statistics Section of the Department of Citizenship and Immigration, Economics and Research Branch of the Department of Labour, Research Branch of the Department of National Health and Welfare, Immigration and Naturalization Service of the U.S. Department of Justice, Circulation and Records Department of the American Medical Association, Migration and Tourists Statistics of the General Register Office of Great Britain and the Institute of International Education, New York. Curious gaps in data reflect lags in methods of collecting information. For example, it is known how many physicians migrate from Canada to Britain by sea, not by air! Nevertheless, the reports of these agencies are invaluable. When preparation of this chapter called for consultation with their representatives one encountered without exception an eagerness to co-operate and an interest in the problems themselves; assets of importance when planning studies for the future. The main premise on which the future supply of physicians is projected is the

TABLE 11–8

MIGRATION OF PHYSICIANS INTO AND OUT OF CANADA, 1950–1962

Year	Immigration			Emigration to U.S.A.	Net loss to U.S.A.	Net gain by immigration
	From U.S.A.	From other countries	Total			
1950	–	68	–	260	–	–
1951	–	166	–	173	–	–
1952	–	293	–	186	–	–
1953	55	347	402	105	50	297
1954	39	272	311	135	96	176
1955	33	300	333	127	94	206
1956	29	386	415	96	67	319
1957	46	589	635	265	219	370
1958	52	342	394	179	127	215
1959	66	373	439	229	163	210
1960	84	357	441	262	178	179
1961	67	378	445	296	229	149
1962	(97)	(433)	(530)	–	–	–
Totals						
1950–61	–	3,871	–	2,313	–	–
1953–61	471	3,344	3,815	1,694	1,223	2,121
Averages						
12 Years	–	323	–	193	–	–
9 Years	52	372	424	188	136	236

Source: Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, (Table 2–6, modified).

record of migration of physicians into and out of Canada prepared for the Commission by Judek.[1] His Table 2–6 is abridged in Table 11–8, with partial data for 1962 added. It will be noted that immigration from the United States is recorded only from 1953 onwards. Missing from the record is the emigration of physicians to countries other than the United States, a point to be discussed later in this chapter.

IMMIGRATION OF PHYSICIANS

In the ten-year period, 1953–62, the average annual influx from all quarters was 435 physicians. The peak of 635 in 1957 coincided with the migration of 117 physicians from Hungary to this country. It was also the year of maximum immigration of British doctors, 311.[2] It has been expected generally that the supply from abroad would dwindle but so far this has not been the case. There was an upswing in 1962 to the second largest influx of the decade and a preliminary

[1] Judek, *op.cit.* See also Department of Labour, Economics and Research Branch, *The Migration of Professional Workers Into and Out of Canada 1946–60*, Ottawa; The Queen's Printer Bull. 11, Oct. 1961.

[2] Department of Citizenship and Immigration. See Clarkson, *op.cit.*, Table V.

report in the first quarter of 1963 indicates that this level may be exceeded. The relation of the increased migration in both directions in 1962–63 to events in Saskatchewan cannot be evaluated fully at this time.[1]

Worthy of closer scrutiny than present information permits is the component of immigrant physicians from the United States, most of whom are beleived to be foreign-born and foreign-trained. In the ten years, 1953–62, they averaged 57 per annum, or 13 per cent of the entering group, with an upward trend in the second half of the period to attain a peak of 97 in 1962 (18.3 per cent of all immigrant physicians for the year). In the first quarter of 1963, 26 (or 16 per cent) came from or by way of the United States. The upswing is thought to reflect only in part the requirement of approved hospitals in the United States that graduates of foreign medical schools pass the test of the Educational Council for Foreign Medical Graduates before being appointed to the intern or resident staff of approved hospitals in the U.S.A. The same regulation came later in Canada with less uniform application. An unknown but probably considerable number have been foreign graduates whose visas expired while doing post-graduate or hospital work and who must allow two years to elapse before attempting re-entry into the United States.

EMIGRATION OF PHYSICIANS

Table 11–8 has limited predictive value because of gaps in data on physicians leaving Canada. Since 1950 there has been a record of Canadian physicians moving to the United States but there is little systematic information about departures to Britain, Europe, Africa and Asia. The number in this category has been assumed to be small. It has been learned that in 1959, 76 physicians migrated to Great Britain by sea, 38 of whom had Canadian passports. In 1960, the corresponding figures were 44 and 24.[2] Emigration to the United States has averaged 193 physicians annually over the 12-year period 1950–61. The number reached 260 or higher in 1950, 1957, 1960 and in 1961 when there was a peak of 296. It is not known how many of those migrating to the United States do so for training only, how many to seek temporary employment and how many for indefinite or permanent residence. The number returning after training is very difficult to ascertain. Certain of the United States require a state registration for appointment to a hospital residency. In 1962, as will be seen later, there were 726 Canadians in training posts in American hospitals.

Taking the figures as they are there was a net loss to the U.S.A. for the nine years for which records are complete of 136 physicians per year with a wide

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[1] Department of Citizenship and Immigration: Of 530 physicians entering Canada in 1962, 130 came from Great Britain; 97 from U.S.A.; Turkey, 27; India, 23; miscellaneous, 173, and "Other Country not British", 79. Their intended destination was described as Quebec, 157; Ontario, 142; Saskatchewan, 64; Newfoundland, 39; British Columbia, 35; Manitoba, 32; Alberta, 27; and the remaining Eastern Provinces, 34. The Department of Public Health of Saskatchewan reports 44 immigrant physicians and 65 non-immigrant physicians entering on a temporary basis and now returned to their homes. The latter are not believed to be included in the figure of 530.
In the first quarter of 1963, 159 physicians have been received (same period in 1962, 64). Of these, only 29 gave Saskatchewan as their destination. For the same period the Department in Regina reports 19 immigrant physicians; non-immigrant physicians, nil.

[2] *Professional Manpower Resources Statistical Handbook*, Department of Labour, Ottawa, 1960, Table D–3.

swing between 50 in 1953 and 229 in 1961. For the five years following the big rise in 1957 the average net loss on this score was 183. Because of its complexity and its importance in any expansion of Canadian medical education this question of how many Canadian physicians go to the U.S.A. and what they do there will be considered in Chapter 12.

How these two opposing movements of entry to the country and departure from it will compare in the future is imponderable at present. However, while Canada can do little to increase the stream of physicians from outside it is conceivable that steps could be taken to increase the attractiveness of the great variety of roles required of medical graduates in Canada.

DEATH AND RETIREMENT AMONG PHYSICIANS

Physicians participate in the increasing longevity of the general population. Their average age at death has risen from 60.8 years in 1926–30 to 66.4 in 1956–61.(For all males of age 20 and over in the latter period it was 67.8 years.)[1] In keeping with this is a decrease in the proportion of physicians' deaths below age 65 and a striking increase in the proportion dying at 75 years or over – 35 per cent in 1956–61 compared with 19 per cent 30 years earlier.

The death rate among Canadian physicians is falling, from 15.8 deaths per 1,000 physicians annually in 1951–55 to 13.6 in the period 1956–61, or 1.36 per cent. To calculate the replacement needs of the medical profession due to death, Judek suggests a factor of 1.5 per cent per annum.

Any further decline in the death rate will work to the advantage of the supply of physicians. This would be more the case as the proportion dying before age 65 decreases. It may well be, that any advantage gained would be offset by a reduced amount of practice on the part of older physicians and by a trend towards earlier retirement on the part of the profession as a whole.

Next to the migration of physicians into and out of Canada the most imponderable factor in calculating manpower requirements is the future pattern of retirement from active professional work. If all physicians in the future were to retire at 65, over 5 per cent would have to be deducted from the total number to compute the active work force. Estimates made in 1943, 1946, 1947 and 1961 (Nova Scotia only) yielded retirement incidences of 6.7, 5.0, 5.6 and 7.1 per cent.[2] In 1962, when 11,560 physicians reported by questionnaire, a retirement incidence of 2.9 per cent was shown. (Of the entire group, 4.6 per cent were 65 or over; 2.0 per cent were 70 or over)[3]. Although this suggests that the average retirement age is close to 70 it does not yield an annual rate of retirement among the country's

[1] Judek, S., *op.cit.*, Chapter 2.

[2] Canadian Medical Procurement and Assignment Board. *Report of the National Health Survey, 1945.* Department of National Health and Welfare. *Survey of Physicians in Canada, 1931–51, 1954.* *The Provincial Medical Board of Nova Scotia*, brief to the Royal Commission on Health Services, Halifax, October 1961.

[3] Questionnaire on Medical Practice, Royal Commission on Health Services, 1962. See also Judek, S., *op.cit.*, Tables 4–4 and 4–5.

physicians. It is also possible that the 46 per cent who failed to make returns included a higher proportion in retirement.

It is a matter of common knowledge that many physicians retain an active interest in their work long past the conventional retirement age. What is less well known is the necessity for many to continue to work because of inadequate savings or pension arrangements.[1] In the future, physicians are likely to share in the generally improving provision for security in old age. What cannot be foreseen is the influence that changes in the scientific and organizational aspects of medicine may have on the physician's attitude towards continuing professional work beyond the age of 65. Will he be like the schoolteacher or the engineer in industry, tending to retire when the majority do at a stipulated age, with limited opportunity to move into a second career? Or will he be like those university teachers, corporation lawyers and technical experts whose judgment and experience are sought by other organizations as soon as their regular duties abate?

Both patterns undoubtedly will be seen. To the extend that medical services become institutionalized and standardized for the sake of efficiency and maximum output of services, it is suggested that the tendency will be to approach the work and retirement patterns of industry. On the other hand, the increasing technical complexity of medicine and consequent divisions of labour should increase the demand for experienced physicians to serve in an advisory or administrative capacity, even on a part-time basis. A natural responsibility for one kind of doctor serving in such a post-retirement role would be guardianship of the subtle human values which tend to be subordinated in complex, expanding enterprises but which are so essential to good medical care. There is every reason to believe that there will be an abundance of opportunity for continued professional work of an appropriate nature for physicians beyond the age of 65. It is also reasonable to assume that although more physicians will seek formal retirement than at the present, and at an earlier age than therefore, nevertheless a majority will wish to continue some kind of useful work in the health field as long as they are able to do so. This point of view has been influential in the selection of a general attrition rate when attempting to project the future supply of physicians.

THE RATE OF ATTRITION OF PHYSICIANS

It is apparent that two different methods may be used to adjust estimates of the supply of physicians for losses due to emigration, death, retirement or change of occupation. The one growing out of discussion up to this point is to identify all the possible channels of loss and to accord to each a magnitude suggested by data available. These figures are then applied against the physician population as augmented annually by new graduates and immigrant physicians. An advantage of this approach is its demand for the best possible analysis of each operational factor. Its disadvantage is that not all factors are measurable satisfactorily and not all may even be known.

The other approach is to measure the actual loss or attrition of physicians *in toto* over a period of time and derive thereby an attrition rate to apply annually

against the physician-population with its increments, as mentioned. Such a gross attrition rate to cover losses due to emigration, death, retirement and change of occupation was developed in the survey made by the Canadian Medical Association in 1961.[1] It was noted that over a seven-year period between 417 and 955 physicians annually could not be accounted for when the numbers of medical graduates and immigrant physicians were added to the number of fully registered, active physicians, who were known to be resident in a province at the beginning of the year. (An allowance of one year was made for the graduates and immigrants to become registered.) The attrition rate was calculated from the number of physicians lost from the count when expressed as a percentage of the average number registered over the 12 months of the year. This varied from a low of 2.48 per cent in 1955 to a high of 5.08 per cent in 1958. The average for the period was 3.35 per cent with a downward trend in 1959 and 1960 (2.66 and 2.88). The CMA projections used an attrition rate of 3.0 per cent.

A similar approach using different data has given Judek a composite attrition rate averaging 3.44 per cent over the nine-year period, 1952–1960, with a spread of 2.82 to 4.48.[2] Non-resident graduates, about 10 per cent, were discarded in the count. Immigrant physicians were counted by the number of registrations recorded each year by the provincial licensing authorities. To allow for some duplication of registration in the immigrant-physician group a composite attrition rate of 3.2 per cent was determined for the projections in the Commission's official manpower study.

A third effort to determine attrition, using features from both of the others, is now presented. It had been decided earlier to gauge the output of the medical schools by the number promoted from fourth year to intern status, even in the case of the three schools granting the degree after the internship. This was to attain uniformity in reporting for later statistical studies. It reflected also the view that the intern although appointed for training purposes did in fact render a substantial amount of medical service. This is also true of the immigrant physician who may work two or three years in hospital before achieving registration, or twice that long if working towards specialist rating. It seemed desirable to deal with data on Canadian graduates and on immigrant physicians if possible in a uniform manner; that is, to count only licensed physicians in both cases, or to count both the Canadians and the foreign graduates as soon as they appear on the professional scene. The possibility that some are not making a professional contribution is inherent in this approach just as it is when using the number of physicians reported in the census. In either case this loss should be one of the elements covered in a composite attrition rate.

Table 11–9 was assembled to cast more light on the question of whether to count new physicians or new registrations in the case of both the graduates of Canadian medical schools and the immigrant physicians. A difference between the two groups is apparent. In the period 1953–1960 the number of immigrant

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[1] Clarkson, *op.cit.*

[2] Judek, *op.cit.*, Table 8–1.

TABLE 11-9

ADDITIONS TO MEDICAL MANPOWER OF CANADA
1950–1962, COMPARISON OF NUMBER OF NEW PHYSICIANS
WITH NUMBER OF NEW REGISTRATIONS IN THE PROVINCES

Year	New physicians			New registrations		
	Graduates of Canadian medical schools	Immigrant physicians	Total	by Canadian graduates	by foreign graduates	Total
1950	791	(68)[1]	(859)[1]	(848)[2]	(196)[2]	(1,044)[2]
1951	858	(166)[1]	(1,024)[1]	902	261	1,063
1952	783	(293)[1]	(1,076)[1]	917	339	1,256
1953	825	402	1,227	(899)[2]	(393)[2]	(1,292)[2]
1954	896	311	1,207	933	488	1,421
1955	894	333	1,227	954	447	1,401
1956	816	415	1,231	909	496	1,405
1957	893	635	1,528	891	582	1,473
1958	828	394	1,222	819	557	1,376
1959	859	439	1,298	811	586	1,397
1960	863	441	1,304	922	521	1,443
1961	834	445	1,279	–	–	–
1962	849	530	1,379	–	–	–
Totals 1953–60 (8 years)	6,874	3,370	10,244	7,138	4,070	11,208
Per cent	67.1	32.9	100	63.7	36.3	100
Excess of new registrations over number of new physicians in per cent				4	21	

[1] Bracketed numbers are incomplete. Only from 1953 was a record made of physicians immigrating into Canada from the United States.

[2] Bracketed numbers are incomplete. One province could give estimates only for registrations in 1950 and 1953.

Source: CMA Survey of Provincial Licensing Authorities, Dec. 31, 1960,
CMA Brief on Future Requirements for Physicians in Canada, submitted to the Royal Commission on Health Services, October 27, 1960,
(also published in *Canadian Medical Association Journal*, 85:1162–1169, 1961).
See also Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, Tables 2–9, 2–10 and 2–11.

physicians was 3,370. During these eight years 4,070 registrations of foreign graduates were reported by the provincial registrars, a difference of 700. Approximately 21 per cent more registrations were counted than one would expect from 3,370 physicians even if they all became eligible for registration during the year following that of landing in Canada. It is concluded that over one-quarter had occasion to register in more than one province and so were counted twice when registrations were enumerated. Similarly, it appears that about 15 per cent of

Canadian residents who graduated from Canadian medical colleges had occasion to register at the same time in more than one province.[1]

In Table 11–10 the attrition is worked out for the seven years 1954–1960, using essentially the same method as in the other studies, namely, to start with the number of active, fully registered physicians reported by the provincial licensing authorities for January 1 of each year as gathered in the survey made by the registrars for the Canadian Medical Association.[2] To this are added the gains during the year from Canadian medical schools and from immigration. The extent to which the resulting theoretical total exceeds the count of registered physicians at the end of the year is a measure of the loss of physicians due to death, retirement, emigration, change of profession or failure for any reason to gain registration. Expressing this loss as a percentage of the average number of registered physicians counted on January 1 and December 31 it represents a composite attrition rate for the year. As in all projections in this report Judek's technique of deducting 10 per cent of the output of the Canadian colleges, for non-residents, has been followed. In each calculation the figures for graduates and immigrants of the preceeding year have been used, as in the CMA survey, to allow for the pre-registration internship.

This approach yields an average composite attrition rate for the years 1954–1960 of 2.91 per cent (range 2.16 – 4.61). Since it excludes in any one year, as a loss, the considerable number of immigrant physicians who take longer than one year to gain registration, yet are rendering useful hospital service meanwhile, this inherent error will work in the direction of exaggerating the rate of attrition. Nevertheless, as an alternative to the rate of 3.2 per cent used in the projections in Medical Manpower in Canada[3] another estimate of the future supply of physicians and of the required output from Canadian medical schools will be based on a general attrition rate of 3.0 per cent compounded annually. (Although this is numerically the same as the rate derived for the Canadian Medical Association the latter's was applied to the entire output of the medical schools. The present usage is to apply it after deducting 10 per cent for non-resident graduates.)

Another variant to be altered in this alternative estimate of physician supply, designated *Projection B*, is the allowance for immigrant physicians. The official estimate by Judek, henceforth referred to as *Projection A*[4], perhaps influenced particularly by long-range considerations as well as recent experience, postulated 350 immigrant physicians annually from 1961 to 1971, and 250 thereafter. *Projection B* assumes 400 immigrant physicians annually for the decade beginning June 1, 1961, 300 from 1971, and 250 from 1981 to 1991. This view stems

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[1] In the eight years ending 1960 there were 6,874 medical graduates from Canadian universities but the number of registrations corresponding to this was 7,138, an excess of only 4 per cent. If one assumes, however, that non-resident graduates numbering 10 per cent of the total returned to their home countries without obtaining a licence to practise in one of the Canadian provinces, then the difference between graduates and registrants would be about 950, an excess of 15 per cent. This is roughly double the number of Canadian students who study medicine in other than the home province (8 per cent of first-year Canadian students in 1962–63). (Macleod, *op.cit.*, Table 6–11.)

[2] Clarkson, *op.cit.*

[3] Judek, *op.cit.*, Chapter 8.

[4] *Ibid.*

TABLE 11–10

AVERAGE COMPOSITE ATTRITION RATE OF CANADIAN PHYSICIANS, 1954–1960
BASED ON NUMBER OF CANADIAN RESIDENTS AMONG GRADUATES OF CANADIAN MEDICAL SCHOOLS
AND NUMBER OF IMMIGRANT PHYSICIANS, BOTH COUNTED ONE YEAR LATER TO PERMIT REGISTRATION

1	2	3	4	5	6	7	8	9
Year	Estimated number of physicians on Jan. 1[1]	Canadian graduates of Canadian medical schools[2]	Immigrant physicians[3]	Theoretical Total (cols. 2 + 3 + 4)	Estimated number of physicians on Dec. 31	Loss in numbers (col. 5 minus col. 6)	Average number of physicians during year (av. of cols. 2 and 6)	Per cent composite attrition (col. 7 as percentage of col. 8)
1954	15,829	771	402	17,002	16,431	571	16,130	3.54
1955	16,431	836	311	17,578	17,221	357	16,826	2.12
1956	17,221	817	333	18,371	17,871	500	17,546	2.84
1957	17,871	734	415	19,020	18,523	497	18,197	2.73
1958	18,523	806	635	19,964	19,096	868	18,810	4.61
1959	19,096	730	394	20,220	19,800	420	19,448	2.16
1960	19,800	765	439	21,004	20,517	487	20,158	2.42
Average 1954–1960	18,161					528.5		2.91

[1] Canadian Medical Association Questionnaire to Registrars of Provincial Licensing Authorities.

[2] Royal Commission on Health Services Questionnaire to medical schools. These are residents of Canada but not necessarily Canadian born.

[3] Department of Citizenship and Immigration. See Clarkson, G.C., Future Requirements for Physicians in Canada, *Canadian Medical Association Journal*, 85:1162, Nov. 1961, Table V.

This is an alternative to calculation in Table 8–1, Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer 1964, based on slightly different premises. It follows the scheme used by Clarkson, *ibid.*

from concentration on the experience of the past decade, 1952–62 inclusive, when the average intake of foreign graduates was 435, with 530 in 1962, and an even higher trend in the first quarter of 1963. (Strictly speaking this projection, to be seen later in Table 11–11, should have used the actual data for 1961 and 1962, namely 445 and 530 immigrant physicians, instead of the theoretical 400. This would add 165 physicians to the supply actually projected for 1966, and 135 for 1971.)

ESTIMATION OF FUTURE SUPPLY OF PHYSICIANS

The supply of medical personnel in the future can be estimated under circumstances of (1) existing educational facilities and (2) expanded facilities to meet one or both of the manpower objectives outlined in this chapter[1]. The future supply, estimated by *Projections A* and *B*, can be matched against *Targets 1* and *2*, converting deficiencies into the educational requirements of the future. These can be expressed in terms of additional graduates, a larger first-year medical class, more applicants for medicine and new medical schools. Any proposals would have to be considered in the light of the educational resources of the country – the supply of university students, the ability of institutions to undertake expansion and the readiness of the community to assimilate new ventures. Some of these points will be dealt with in Chapter 12. First, however, it is necessary to outline the characteristics of the two estimations of physician supply selected for this study.

Projection A, its relation to physician requirements and the implications for future medical school recruitment are set forth by Judek in two basic tables in his study.[2] *Projection B* is derived from the medical school data of Table 11–6 and its yearly levels of physician supply are detailed in Table 11–11. Both projections assume certain expansions of medical school intake indicated by the deans of medicine as feasible without major changes in facilities. Both allow for the opening of a new medical school at the University of Sherbrooke. *(Projection B* was constructed on the supposition of its reception of medical students in 1968–69. An adjustment is made in later calculations to fit in with its plan to open in 1967–68 with a more rapid expansion of its first-year class than indicated earlier.) The two projections are compared in Table 11–12 in respect to their assumptions and predictions.

It is instructive to note the differences in the supply of physicians yielded by these two projections. Each can be derived logically from the data available depending upon where the emphasis is laid and how one balances a recent trend against an average over a longer period. The difference between attrition rates of 3.0 and 3.2 per cent on a small group over a short span of time is slight. For example, the addition of 100 immigrant physicians each year with an annual loss of 3.0 per cent would yield counts at five-year intervals of 471, 875, 1,222 and 1,520. The corresponding figures for an attrition rate of 3.2 per cent annually would be 469, 868, 1,207 and 1,495. On the other hand, if the two

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[1] See p. 189.

[2] Judek, S., *op.cit.*, Tables 8–2 and 8–3.

TABLE 11–11

PROJECTION B – SUPPLY OF PHYSICIANS IN CANADA, 1961–1991

Based on expected output of medical schools without major expansion (except the University of Sherbrooke which is included)[1] in terms of resident Canadians admitted to intern year (total number less 10 per cent); 400 immigrant physicians to 1971, 300 to 1980 and 250 to 1991, and a composite attrition rate of 3.0 per cent applied annually.

Year	Number of physicians	Attrition at 3.0%	Output Canadian graduates	Immigrant M.D.'s	Gain in year
1961	21,290	639	758	400	–
1962	21,809	654	768	400	519
1963	22,323	670	724	400	514
1964	22,777	683	742	400	454
1965	23,236	697	769	400	459
1966	23,708	711	837	400	472
1967	24,234	727	861	400	536
1968	24,768	743	908	400	534
1969	25,333	760	929	400	565
1970	25,902	777	929	400	569
1971	26,454	794	929	300	552
1972	26,889	807	961	300	435
1973	27,343	820	967	300	454
1974	27,790	834	975	300	447
1975	28,231	847	981	300	441
1976	28,665	860	981	300	434
1977	29,086	873	981	300	421
1978	29,494	885	981	300	408
1979	29,890	897	981	300	396
1980	30,274	908	981	300	384
1981	30,647	919	981	250	373
1982	30,959	929	981	250	312
1983	31,261	938	981	250	302
1984	31,554	947	981	250	293
1985	31,838	955	981	250	284
1986	32,114	963	981	250	276
1987	32,382	971	981	250	268
1988	32,642	979	981	250	260
1989	32,894	987	981	250	252
1990	33,138	994	981	250	244
1991	33,375		981	250	237

[1] Enrolment of 40 students at the University of Sherbrooke was assumed for 1968/69, increasing by eight annually to 64 in 1971/72. This has been corrected in later calculations of output to allow for the reception of 40 in 1967/68, 50 in 1968/69 and 64 thereafter. The revised projection is found in Table 11–13 and has been used to derive the data in Table 11–14.

TABLE 11–12

ESTIMATES OF PHYSICIAN SUPPLY FOR CANADA, 1961-1991

Based on existing plans for expansion of training facilities, including the University of Sherbrooke, 1968–69.[1]
Comparison of two projections A and B in respect to premises and estimated results.

	Projection A[2]		Projection B[3]	
Premises				
1. Medical school intake	rounded figures		specific estimates	
2. Undergraduate attrition	10% throughout		reduction in 8 years from 16.7 to 10%	
3. Medical school output	number of graduates (with or without internship), less 10% non-residents		number entering internship (with or without degree), less 10% non-residents	
4. Annual number of immigrant physicians (gross, as from June 1)	1961-1971 – 350 1971-1991 – 250		1961-1971 – 400 1971-1981 – 300 1981-1991 – 250	
5. Attrition of physicians (annually, all causes)	3.2 per cent		3.0 per cent	
Estimated Results				
1. Medical school output (a) in five-year period, (b) cumulative totals	(a)	(b)	(a)	(b)
1961-1965	4,000	4,000	3,761	3,761
1966-1970	4,500	8,500	4,464	8,225
1971-1975	4,750	13,250	4,813	13,038
1976-1980	4,750	18,000	4,904	17,942
1981-1985	4,750	22,750	4,904	22,846
1986-1990	4,750	27,500	4,904	27,750
2. Census of physicians	(starting with 21,290, June 1, 1961)			
1966	23,489		23,708	
1971	25,826		26,454	
1976	27,579		28,665	
1981	29,069		30,647	
1986	30,335		32,144	
1991	31,410		33,375	

[1] These projections were based on enrolment of medical students at University of Sherbrooke in 1968-69 (see Table 11–11, reference footnote 1 for details). A corrected version of Projection B is found in Table 11–13 to allow for the opening of this new medical school one year earlier and with a more rapid attainment of full class size than was assumed above. Table 11–14 is based on the new projection.

[2] *Projection A* is derived from Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, Tables 2–6, 3–15, 8–1, 8–2 and Appendix 8–3.

[3] *Projection B* is derived from Tables 11–6, 11–8, 11–10 and 11–11 of this report.

rates were applied to a population of 32,000 physicians, as might be the case in 1976, the losses in one year would be 960 and 1,024 respectively, a difference equal to the output of one medium-sized medical school.

By the same token, if *Projection B* has overestimated immigration by 50 physicians a year then the five-year totals would have to be reduced by 235, 438, 611, 760 and 888. On the other hand, a single injection of 100 physicians into the pool, if subjected to an annual loss of 3.0 per cent, would leave 85 survivors in five years, the count at successive, similar intervals being 73, 63, 53, 46, and at 30 years, 41. Viewed in this perspective the two projections, *A* and *B*, are reasonably close together in the magnitude of their predictions. The rounded figures of *Projection A* make it easier to use in large scale, long range calculations. For those working with the details of medical school admissions, *Projection B* has advantages.

In summary, the projections of physician supply can be no more reliable than the assumptions on which they rest. In fact, the projections are even less reliable than the assumptions because they depend upon a larger number of variables. Deviations in these may cancel one another out or they may combine to produce a very large departure from the result predicted. This could happen if in one year there were an unforeseen swing towards early retirement, a large migration of Canadian physicians to the United States, and a sharp reduction in physician immigration into Canada. The chance of error is compounded when estimates of physician supply are matched against even more arbitrary estimates of physician requirement. Nevertheless such guesses must be attempted if Canada is to base an obviously urgently needed expansion of medical education facilities on some kind of rationale.

THE RELATION OF PHYSICIAN SUPPLY TO REQUIREMENT

It is now time to turn back to the two estimates made of the number of physicians required to serve the Canadian people if counted at five-year intervals to 1991. Both projections assumed a rate of growth of population that would take place if immigration were to exceed emigration by 50,000 annually. *Target 1* would maintain the physician-population ratio of 1961, 1:857 (116.6/100,000) throughout the 30-year period. *Target 2* would improve the ratio gradually to attain 1:749 (133.5/100,000) by 1991, the present incidence of physicians in the United States. How does the projected supply of physicians in Canada compare with these objectives? The results are seen in Table 11–13 where *Projection B* is taken as the measure of future supply, with the opening of a medical faculty at the University of Sherbrooke included as the only major expansion in educational facilities.

The estimated supply in 1966 and 1971 exceeds *Target 1* slightly but falls below *Target 2* by 479 and 1,082. These deficits would be reduced by two-thirds (to 151 and 348) if the actual immigration experience of 1961 and 1962, namely a nil net immigration, were to prevail until 1971. If net immigration were to be sustained at 25,000, as in the first quarter of 1963, then the deficits would

TABLE 11–13

METHODS OF INCREASING SUPPLY OF PHYSICIANS IN CANADA TO MEET REQUIREMENTS, 1961–1991

Requirements at five-year intervals are expressed at two levels:
Target 1 – Maintenance of physician-population ratio at 1961 level of 1:857(116.7/100,000).
Target 2 – Median between *Target 1* and levels obtained by improving ratio by 0.85 per cent annually; both at annual net immigration of 50,000.

Supply of physicians is based on 400 immigrant physicians to 1971, 300 to 1981, 250 to 1991; annual attrition rate of 3.0 per cent to include migration, retirement and death, medical school output is measured by number of Canadian residents entering internship each June, whether graduate or undergraduate, i.e., total class less 10 per cent.
Balance expressed at intervals as surplus or deficit.

	Number of physicians in Canada at five-year intervals					
	1966	1971	1976	1981	1986	1991
REQUIREMENT						
Target 1 (T–1) – to maintain physician-population ratio at 1961 level of 1:857 (116.6/100,000)	23,683	26,358	29,443	32,959	36,809	40,964
Target 2 (T–2) – to increase the ratio to 1:749 (133.5/100,000) by 1991	24,187	27,536	31,432	36,013	41,164	46,878
SUPPLY						
1. Present facilities, Projection B (includes increased student intake to 1,147, believed by deans to be feasible with present facilities and includes the University of Sherbrooke opening 1967-68)	23,708	26,486	28,730	30,702	32,191	33,417
Balances	T–1+25 T–2–479	+ 128 – 1,050	– 713 – 2,702	– 2,257 – 5,311	– 4,618 – 8,973	– 7,547 –13,460
2. New steps and/or facilities						
a. Accept 83 additional Canadian residents annually from 1966-67; to yield 75 annually from 1969-70 (N.B. These are not necessarily NEW places in class)	–	148	479	765	1,010	1,221
b. New medical schools						
No. 1 – Admit 48, 1968-9, 64, 1969-70; yield 39 Canadian resident interns June 1972, 52 in 1973	–	–	233	445	627	782
No. 2 – Admit 48, 1969-70, 64, 1970-1; yield 39, 1973, 52, 1974	–	–	187	410	594	753
No. 3 – Admit 48, 1970-1, 64, 1971-2, yield 39, 1974, 52, 1976	–	–	139	369	557	724
No. 4 – Admit 48, 1971-2, 64, 1972-3, yield 39, 1975, 52, 1976	–	–	89	322	521	692
c. Subsequent annual increase by new schools or expansion of existing ones: enrolment to be increased by 32 annually from 1972-3, yielding annual increment of 26 from 1975-76 to 1990-91	–	–	26	518	1,553	3,054
TOTALS	23,708	26,634	29,883	33,531	37,053	40,643
Balances						
Target 1	+ 25	+ 276	+ 440	+ 572	+ 244	– 321
Target 2	– 479	– 902	– 1,549	– 2,482	– 4,111	– 6,235
Physician-population ratio	1:856 (or 1:850 see text)	1:848	1:844	1:842.4	1:851	1:863.7

be reduced by about one-third (to 315 and 707). Expressed another way, a supply of 23,708 physicians in 1966 would yield a physician-population ratio of 1:845, 1:850 or 1:856, depending upon whether the annual net immigration in the preceding five years has been 0, 25,000 or 50,000.

The need of increase in the supply of physicians becomes more obvious in 1976 when 28,730 physicians in Canada would mean a ratio to population of 1:878 (114/100,000). This would be a regression to the state of supply of physicians in 1960. Whether the threat of such a decline in supply by the mid-1970's should call for heroic measures in the immediate future may be a matter of debate at the policy level. If any substantial increase in the volume of medical service to be rendered by the practising profession is anticipated then it would be essential not only to attain *Target 1* but to make good progress in the direction of *Target 2*.

Failure to expand existing facilities, according to these projections, would yield deficits in 1981 of 2,257 and 5,311; and a physician-population ratio for the country of 1:920 (108.6/100,000). The calculations are continued also to 1991. With so much room for deviation the totals emerging for that decade should be interpreted with a wide margin for error in either direction. Analysis of the record of the next ten years, especially if more complete in virtually every class of data used in this study, would permit a more accurate forecast of requirements and of supply in the final decade and a half of this 30-year period.

METHODS TO INCREASE THE SUPPLY OF PHYSICIANS IN CANADA

Our proposal is a programme of expansion of facilities in medical education that would augment the supply of physicians in Canada to the point not only of surpassing *Target 1* at every five-year period but also of improving steadily the proportion of physicians in the population. The proposals listed in Table 11–13 offer only partial success in attainment of those goals. The surplus at the *Target 1* level increases to a maximum of 572 in 1981 but becomes a deficit ten years later. *Target 2* is not achieved in any year. Nevertheless there is a steady improvement in the physician-population ratio from at least 1:856 in 1966 to approximately 1:842 in 1981 (118.7/100,000), then a falling-off in 1986 and 1991 at a more rapid rate. If the premises underlying these projections are sustained then it is clear that additional supply should be contrived for the decade following 1981.

PROPOSALS

Part 1. To attain the output proposed for the medical schools in Table 11–13 the first step should be to make secure the increased intake of students indicated by the deans as feasible without major expansion of facilities. This has led already to an increase in first-year enrolment from 1,006 in 1961-62 to 1,057 in 1962-63. The objective is 1,147 by 1965-66 (Table 11–6). Certain conditions upon which this attainment is predicated have been stated on page 194 ff.

Part 2. The next proposition is to accept from 1966-67 an additional 83 Canadian residents in the first-year of the 12 medical schools as a whole. This

would provide a further 75 graduates a year which, after allowing for losses due to emigration, death, etc., should add over 1,000 physicians to the count by 1986. This step does not demand that 83 new places be created in the medical schools; perhaps only one-half or two-thirds of that number, depending upon the proportion of non-resident students replaced by Canadian residents. It is hoped that this gain might be accomplished by collaboration between the universities without the requirement of major new construction.[1]

The relation of this issue to such subsidization of medical schools and teaching hospitals as may take place in the future will require further study. Benefits to Canadian medical education accrue undoubtedly from the presence of well qualified representatives from other settings and traditions. The presence of a number of superior students from the colleges of the United States and elsewhere has added stimulus and breadth to many a class in our medical schools. The criteria, however, for selection of non-resident students on this basis have not been made clear. In the survey of enrolment made by the Association of Canadian Medical Colleges in 1962 appears this observation: "Universities should re-examine their admission policies for non-residents in relation to out-of-province as well as overseas students. It is suggested that these policies should reflect a more explicit philosophy of Canada's role in international medical education."[2]

The measures just described, including the new school at Sherbrooke, P.Q., would provide in 1971 a surplus at the *Target 1* level of 276, an improvement in the physician-population ratio to 1:848 and yet a deficit by *Target 2* of 902 physicians. If a better supply than this is required it would have to come from immigrant physicians in excess of 400 a year. The projection used postulates a decline from this source to 350 beginning in 1971, and 250 from 1981.

If no new training facilities were created the above arrangements would lead to a *Target 1* deficit of 234 physicians by 1976 and of 1,492 by 1981.

Part 3. This calls for the construction of new facilities. As depicted in Table 11–13 it envisages a "crash programme" of new medical school planning to begin immediately. Starting in 1968-69, a year after the opening of medical classes at the University of Sherbrooke, the schedule calls for the reception at New School Number One of 48 students, increasing to a class of 64 the following year when New School Number Two opens with 48, an increment in 1969-70 of 64 new places in first-year medicine. Similar increments of 64 are proposed for 1970-71 and 1971-72, 48 for 1972-73 and an additional 32 each year from 1973-74 through to 1987-88, the last year in the survey period when freshmen medical enrolment can influence the supply of physicians in 1991 (see Table 11–14).

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[1] In 1962-63, 125 non-Canadian students were received in first-year classes of Canadian medical schools, 11.8 per cent of the total. Of these, 67 were from the United States, 50 from the British Commonwealth and 8 from other countries. See also Table 11–7.

[2] Macleod, *op.cit.*
Projections made in this study rest on the premise that up to 10 per cent of graduates will be non-residents who will leave the country after internship. If these are enrolled with care, and in the light of deliberate policy, then Canada should be able to receive the benefits of diversity and at the same time make a substantial contribution annually in the training of physicians for the rapidly developing countries.

The schedule specifies four new medical schools opening in successive years between 1968-69 and 1971-72, each starting with a class of 48, increasing the next year to 64. Beginning in 1972-73, an annual increment of 32 students is postulated without indicating if these are to be accommodated in further new schools or in expansion of existing schools. Indeed, the whole schedule of new schools could be re-arranged without altering their output significantly. New School Number One or Number Two might accommodate 80 or 96 students after two or three years of operation. The main objective is to build up the intake rapidly between 1966-67 and 1971-72, from 1,230[1] to 1,534 first-year students in the five years, an average increase of 60 students per year. In the following 16 years an increase to 2,062 is charted, an increase at about half the earlier rate, viz. an average increase of 32 per year. Although this projection calls for reoughly a doubling of medical student enrolment in a quarter-century, it is not sufficient to maintain in 1986 and 1991 the improvement in physician supply attained earlier (see physician-population ratios in Table 11–13). This problem will be discussed again.

Parts 1 and 2 of the proposals would require 13 medical schools (12 now existent plus Sherbrooke) to handle 1,294 students, subject to the reduction mentioned.[2] The additional 768 places assumed by 1987-88 would require by the same average of 100 students per institution an additional seven and a half schools. A more likely distribution would be four schools of 96 and six of 64 entering students, a total for Canada of 23 medical schools in the mid-1980's with an average enrolment of 85.

If experience in the next 15 years sustains the premises used so far then what should be done about the widening gap between requirement and supply revealed at the 1986 and 1991 counts? Theoretically, this could be corrected by increasing the rate of increase in medical school intake by changing the annual increment from 32 to 40 beginning in 1981-82. Allowing for an undergraduate attrition of 10 per cent, another 10 per cent loss of non-resident graduates at the intern stage and a further 3.0 per cent deducted annually for the general attrition among physicians, this would add to the previous totals at 1986 and 1991 further gains of 216 and 1,132 physicians respectively. Compared with the *Target 1* requirements there would be surplus balances in these two years of 460 and 811, and by *Target 2*, deficits of 4,355 and 5,100. Translated into physician-population ratios the gains from this further adjustment would yield indices of 1:846 in 1986 and 1:840 in 1991. By 1987-88 the medical school intake would have risen by 56 to 2,118.

Further refinement of these calculations to predict the expansion of undergraduate medical education required a quarter of a century hence would be misleading. With the passing of each decade from the point at which the projections

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[1] Table 11–14.

[2] To the extent that the 83 Canadian-resident students replace non-resident students the requirement of "new places" in first-year medicine will be reduced. The 1966-67 total, therefore, of 1,230 required places might well be 1,200, or 1,175. Such a saving would reduce the totals in Table 11–14 through to 1987-88 by the same amount.

TABLE 11–14

NUMBER OF PLACES IN FIRST–YEAR CANADIAN MEDICAL CLASSES TO BE FILLED 1962-63–1987-88 AS REQUIRED FOR PROJECTION OF PHYSICIAN SUPPLY TO 1991[1]

Counting both resident and non-resident students. 10 per cent of graduates assumed to be non-resident (except for group of 83 Canadian resident-students starting 1966-67, yielding 75 interns from 1969-70)

Year	First year places Projection B	Increments from various sources							Total number of first-year places	Increment for year
		Canadian residents	University of Sherbrooke	New school no. 1	New school no. 2	New school no. 3	New school no. 4	Annual increase by 32 from 1972-73 to 1987-88		
1962-63	1,057								1,057	—
1963-64	1,087								1,087	30
1964-65	1,117								1,117	30
1965-66	1,147	—							1,147	30
1966-67	1,147	83	—	—					1,230[2]	83
1967-68	1,147	83	40	—					1,270	40
1968-69	1,147	83	50	48	—				1,328	58
1969-70	1,147	83	64	64	48	—			1,406	78
1970-71	1,147	83	64	64	64	48	—		1,470	64
1971-72	1,147	83	64	64	64	64	48	—	1,534	64
1972-73	1,147	83	64	64	64	64	64	32	1,582	48
1973-74	1,147	83	64	64	64	64	64	64	1,614	32
1974-75	1,147	83	64	64	64	64	64	96	1,646	32
1975-76	1,147	83	64	64	64	64	64	128	1,678	32
1976-77	1,147	83	64	64	64	64	64	160	1,710	32
1977-78	1,147	83	64	64	64	64	64	192	1,742	32
1978-79	1,147	83	64	64	64	64	64	224	1,774	32
1979-80	1,147	83	64	64	64	64	64	256	1,806	32
1980-81	1,147	83	64	64	64	64	64	288	1,838	32
1981-82	1,147	83	64	64	64	64	64	320	1,870	32
1982-83	1,147	83	64	64	64	64	64	352	1,902	32
1983-84	1,147	83	64	64	64	64	64	384	1,934	32
1984-85	1,147	83	64	64	64	64	64	416	1,966	32
1985-86	1,147	83	64	64	64	64	64	448	1,998	32
1986-87	1,147	83	64	64	64	64	64	480	2,030	32
1987-88	1,147	83	64	64	64	64	64	512	2,062	32

[1] This reflects the output from newly created facilities as set forth in Table 11–13. Theoretically, there should be a further increase in the rate of expansion of first-year intake beginning around 1981 (see text).

[2] To the extent that these 83 additional Canadian residents replace non-resident first-year students the requirement of "new places" in the first-year medical class will be reduced. The 1966-67 total, therefore, of 1,230 required places might be only 1,200 or 1,175.

were formulated, their underlying assumptions are open to more and more uncertainty. In fact, if statistical measures of probable error had been used throughout this study then the tentative nature of most of the conclusions would almost certainly have received sharper emphasis. Perhaps the main justification for extrapolating the experience of the past decade into the 1980's is the glimpse it gives of the general order of magnitude of the population and of the corps of physicians and medical students with which one will have to deal at that time. It has permitted also the further illustration of techniques of analysis which should have greater reliability in short-range studies.

In this connection it is satisfactory to note the extent to which the above projection of future medical student supply corresponds to another estimate of requirement expressed in other terms. Professor Judek calculated the average annual enrolment needed in each five-year period to meet each of six different sets of circumstances depending upon net immigration per annum and a physician-population ratio that was either static or improving at a fixed rate.[1] From these possibilities were selected two slates of enrolment figures corresponding to *Targets 1* and *2* already described. In Table 11–15 these are compared with similar five-year averages of enrolment that would be possible with the expansion of educational

TABLE 11–15

FIRST-YEAR MEDICAL SCHOOL ENROLMENT REQUIRED TO MEET CERTAIN STANDARDS OF PHYSICIAN SUPPLY IN CANADA, 1961–1991

Comparison with projected intake of new and expanded medical schools

Five-year periods of enrolment	Annual medical student intake expressed as average of five-year periods		
	Requirements		Supply
	Target 1[1]	Target 2[2]	(expanded facilities)[3]
1957-58 to 1961-62	942	1,063	985[4]
1962-63 to 1966-67	1,094	1,274	1,128
1967-68 to 1971-72	1,398	1,635	1,402
1972-73 to 1976-77	1,611	1,938	1,646
1977-78 to 1981-82	1,816	2,237	1,806
1982-83 to 1986-87	2,026	2,555	1,966[5]

[1] *Target 1* is Judek's minimum requirement, based on constant physician-population ratio and annual net immigration of 50,000.

[2] *Target 2* is the median position between Judek's minimum and maximum levels of physician-requirement.

[3] Derived from Table 11–14 except in first period.

[4] Derived from Table 11–6.

[5] This would become 1,992 if each year from 1980-81 an additional eight students were received.

Source: Tables 11–3, 11–6 and 11–14. Note also Table 11–12. Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, Table 8–3.

[1] Judek, *op.cit.*, Table 8–3.

facilities just outlined. Again it is apparent that the proposed supply would maintain the physician-population ratio of 1961 through the 1970's but would do little to improve the ratio.

It is of interest to compare the above estimate of the number of first-year medical students needed in the future (Table 11–15) with an earlier projection made by Clarkson for the Canadian Medical Association in 1961.[1] Using all the data available at that time (the June 1 census returns were not yet at hand) its well-documented report pointed up the seriousness of the shortage of physicians that lay ahead. Despite a number of differences in the assumptions about immigration and population the CMA prediction of the required first-year enrolment is remarkably close to the estimate reached in the current approach. They are compared in Table 11–16.

TABLE 11–16

ESTIMATES OF REQUIRED FIRST–YEAR ENROLMENT IN CANADIAN MEDICAL COLLEGES, 1962-63 TO 1976-77

Comparison of data obtained in two studies

Year	Number of students to be enrolled in first year	
	Canadian Medical Association, 1961	Royal Commission on Health Services 1963
1962-63	1,065	1,057[1]
1963-64	1,106	1,087
1964-65	1,145	1,117
1965-66	1,185	1,147
1966-67	1,225	1,230
1967-68	1,265	1,270
1968-69	1,305	1,328
1969-70	1,345	1,406
1970-71	1,385	1,470
1971-72	1,430	1,534
1976-77	1,690	1,710

[1] Actual enrolment in 1962-63.

Source: Clarkson, G.C., "Future Requirements for Physicians in Canada," *Canadian Medical Association Journal*, 85:1162–1169, November 1961. Also in brief of Canadian Medical Association to Royal Commission on Health Services, 1962, and Table 11–14 of this study.

THE NEED FOR RESEARCH ON MANPOWER REQUIREMENTS AND SUPPLY

This Medical Education Project group embarked on its studies amid a climate of grave concern over an impending shortage of physicians. With the prospect of additional services to be rendered on a widening front it was noted that all doctors appeared to be fully employed; that one-third of new physicians

[1] Clarkson, *op.cit.*, Table XII.

came from abroad, a source that might well undergo sharp reduction; and that Canada seemed to be in the grip of a relentless and rapid growth in population. In the main these general assumptions appear to be sustained. There is still, however, much uncertainty about the factors that determine society's requirement of physicians, whether this refers to a verifiable need, to public expectations or to the capacity of the affluent community to support an apparently unlimited number of physicians. Much is still unknown of the factors that influence the supply of physicians. Nevertheless proposals have been made to increase substantially the output of existing medical schools and to build new ones. Quite apart from the great demand on the public purse such expansion would be costly also in terms of Canada's human resources. It is of the utmost importance to be as sure as possible that the measures taken are necessary and will produce results in the best public interest.

It is obvious to members of this group that all of the factors that either make for or diminish the adequacy of manpower in relation to requirements will need constant attention for an indefinite time in the future. For this reason this study includes the recommendation for research on these broader aspects of the public health at university, provincial and national levels. In addition to appropriate investigation in university departments of social medicine and social science and in the research divisions of provincial health departments a plea is made for an "Institute of Health Studies".[1] Working closely with these bodies and with the national departments of Health and Welfare, Citizenship and Immigration, Labour, and the Dominion Bureau of Statistics, the Institute would maintain an over-all view of the many interlocking factors that shape the health requirements of Canada as a whole. At the same time it would keep constant vigil on the changing forces that determine the supply of health personnel.

Reference was made earlier in this chapter to the need to take steps to conserve the time and effort of physicians, particularly in those roles for which training is lenghty and expensive. Among the steps which have specific implications for medical education are those which call for

1. greater sharing of suitable types of responsibility and work with allied health professions,
2. more effective use of auxiliary, non-professional personnel,
3. full exploitation of automation and labour-saving devices, and
4. further experimentation with the principle of division of labour between physicians, e.g., by means of group practice and a regional arrangement of consultant and hospital services.

It is a moot point whether such steps would ease the requirement of physicians. Two authoritative manpower specialists in the U.S. Public Health Service believe it safe to assume that "better utilization of physicians' services can effect only modest savings in professional time".[2]

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[1] Chapter 15, p. 280 ff.

[2] Peterson, Paul Q., and Pennell, Maryland Y., "Physician-Population Projections, 1961–1975: Their Causes and Implications", Amer. J. Pub. Health, 53:163–172, Feb., 1963. Quoted by Judek, *op.cit.*, Chapter 8.

On the other hand, one of North America's most experienced statesmen in medical education, the former Dean of Medicine at Columbia University, has said this:

> "If progress can be made in the better utilization and management of medical facilities, resources and personnel through functionally structured hospital services, ambulatory care, laboratory services, home care, nursing homes, public infirmaries and group practice that would increase the efficiency of health care by even five to ten per cent, which is quite conservative, the results could be equivalent to the output of perhaps 10 new medical schools and at great financial savings."[1]

This question can be settled only by experiment in a relatively new but eminently important field of *operations research* in medical care and in health service administration.

Perhaps the most effective step to conserve skilled manpower may turn out to be new efforts in health education of the public by all the members of the health team. The object would be to foster public understanding of the purposes of good health care and to encourage a sense of responsibility for an economical and considerate use of personnel and facilities. This would be most telling if at the same time the arrangements for practice, including remuneration, did not make for over-servicing or costly types of competition. It would harmonize with a view of the enlarging role of the physician with his patient as being less that of the technician and more that of the teacher – that is, a "doctor" in the oldest sense. As science discloses new knowledge of how to forestall injury and disease then perhaps the better the physician is as a teacher the more persons he can carry as the regular guardian of their health.

SUMMARY

A country must have medical manpower in proportion to its needs of medical service. The physician-population ratio in Canada in 1961 was 1:857, or 116.7 per 100,000.

To maintain or improve the physician-population ratio there must be a balance between, on the one hand, population increase, graduation of new physicians and immigration of foreign physicians and, on the other, emigration of physicians and annual attrition due to death and retirement. An increase in the ratio will depend chiefly on an increase in the number of Canadian graduates; the actual number of physicians required within the next twenty years will depend principally on the rate of population increase and the demands for an increase in the volume of service.

In 1961 there were 21,290 physicians in Canada. Assuming a natural expansion of population, supplemented by an annual net immigration of 50,000, the number of physicians required to maintain the current ratio would be: in 1966 – 23,683; in 1976 – 29,443; in 1986 – 36,809; in 1991 – 40,964. Should there be an annual improvement of 0.85 per cent in the physician-population ratio, as was the

[1] Rappleye, Willard C., in "Critique of Report on Medical Education" (p. 101), *Med. Education and Research Needs in Maryland*, Committee on Medical Care, Maryland State Planning Commission, Baltimore, January 1962.

case from 1950 to 1960 if immigrant physicians are not counted, the requirement would be: in 1966 – 24,691; in 1976 – 33,421; in 1986 – 45,520; in 1991 – 52,792.

It is proposed that our target be a compromise midway between a maintenance of the current ratio and an annual expansion by 0.85 per cent. This would require the following number of physicians and produce the following ratios:

	Physicians required	Physician – Population ratio	
1966	24,187	1:839	(119 per 100,000)
1976	31,432	1:803	(125 per 100,000)
1986	41,164	1:766	(131 per 100,000)
1991	46,878	1:749	(134 per 100,000)

The average annual output of graduates of the twelve Canadian schools in the period 1953 to 1962 was 855, of which 10 to 12 per cent were non-residents and were not likely to practise in Canada. The annual Canadian potential may be considered, then, to have been 752, but this is reduced by the (unknown) number of Canadians who emigrate to the United States or other countries to practise. During that period, however, 35 per cent of all new registrants for practise in Canada were trained in foreign schools, and the attrition rate of physicians in practice(due to death, retirement and emigration) was approximately 3 per cent. Obviously, in order to maintain or improve our present ratio, in an expanding population, we must:

1. increase the output of Canadian doctors;
2. maintain a continued immigration of foreign physicians (or compensate by a further increase in the number of physicians trained in Canada);
3. reduce the proportion of Canadians who emigrate for practice; or
4. reduce other causes of attrition.

The 12 Canadian schools have already undertaken to expand their classes, which should, within the next five years, increase their annual graduation of *Canadian* physicians to an average of 893 and, in the succeeding four years, to an average of 963. The University of Sherbrooke will open a school in 1967; its first class of 40 should graduate in 1971. The total Canadian output up to that year will meet the requirements necessary to maintain the present physician-population ratio, provided the annual immigration of foreign doctors continues at the current rate (400); but if we wish to improve the ratio significantly, it will fall short by 902. Moreover, if no new schools are opened, there will be, by 1981, a deficit of 1,492 in the numbers necessary to maintain even the present ratio. It is proposed, therefore, that four additional schools be established in the successive years between 1968 and 1971, and that, in succeeding years, there be additional expansion of existing schools or establishment of more new schools.

This will assure a slight increase in the physician-population ratio until 1986 (provided there is a continuing immigration of foreign physicians, 300 annually from 1971 and 250 from 1981) but not in succeeding years. It will fall far short, however, of raising the ratio progressively to the level required by the

proposed compromise between current maintenance and the annual expansion by 0.85 per cent enjoyed between 1950 and 1960. Even with the most sanguine expectations from expanding our educational programme we shall lose ground if immigration of foreign-trained physicians should cease.

Continuing attention should be given by competent authority to questions of the medical manpower requirement of the future and of the supply of physicians from all sources, and to such methods and circumstances as will ensure the most effective rendering of service by physicians and supporting health personnel. To foster and conduct such research an Institute of Health Studies is recommended, as described in Chapter 15.

CHAPTER 12

EXPANSION OF EDUCATIONAL RESOURCES

GOALS OF THE MODERN UNIVERSITY MEDICAL OR HEALTH SCIENCES CENTRE

The need to double the intake of medical students in Canada in the next quarter century was forecast in the last chapter.[1] If the suppositions about population growth, the migration of physicians and the requirement of increased medical services should be sustained, then a somewhat startling development of new medical schools and teaching hospitals, along with the enlargement of existing institutions, will be required.[2] What principles should guide the universities and teaching hospitals in their undertaking of expansion or of new developments? What demands will these undertakings make on the resources of the institutions concerned and of the country? What arrangements and criteria can be suggested to ensure the attainment of the desired goals and to protect whatever investment in these ventures Canadian society may decide to make? These are the questions for which provisional answers will be attempted in this chapter. They will be subject to revision in the light of further information to be gleaned from studies now in progress or to be initiated later.

Most studies of the future requirements of personnel in the field of health reveal an almost hypnotic preoccupation with the *number* of graduates. Often the fixation on numbers is further limited to the numbers of M.D.'s alone, despite the fact that the physician no longer can play his full role effectively without drawing on the skills of other professional and auxiliary colleagues. To maintain perspective in the discussion that follows, the goals recommended for the *modern university health sciences centre* are re-stated as follows:

1. to produce its share of the health personnel needed;
2. to ensure adequate continuing educational opportunities for both professional and auxiliary personnel;

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[1] Table 11–14.

[2] Although the term *medical school* may be used for the sake of simplicity and because of habit, it is to be understood here to mean the broadly based *university medical* or *health sciences centre* directed towards the four major goals to be described.

3. to establish models of health care of high standard for its constituent region;
4. to conduct research of appropriate substance and diversity, not only to advance knowledge in the fields of science essential to medicine but also to evaluate (a) its own educational operations, (b) the health needs of the community, and (c) the quality of the care being rendered.

The members of this group found these concepts reflected in the most vital thinking on medical education in both Canada and the United States as well as overseas. They would say with conviction that although up to the present no Canadian university with a medical faculty has yet committed itself to all of these goals, nevertheless any new medical centres to be established should have them among their objectives.

NECESSARY CONDITIONS FOR FOUNDING NEW UNIVERSITY HEALTH SCIENCES CENTRES

In their teaching, research and service functions, university medical centres tend to relate themselves increasingly to the needs of major regions or of the country as a whole. This is in addition to their contribution to the needs of the provincial, district and municipal communities. It is assumed, therefore, that any decision to establish a new centre in a particular region of Canada must be based upon the most comprehensive consideration of requirements of personnel, of standards to be elevated and of new programmes to be instituted. Before a decision is made, however, specific proposals should be examined in the light of certain necessary conditions that must obtain if the undertaking is to achieve its goals in the most effective manner. The necessary conditions may be described as follows:

UNIVERSITY AUSPICES

Any new medical centre in Canada should be sponsored by a university and located in the same city as the university. In the United States there are several outstanding medical centres that have created a university atmosphere and have developed their own strength in the basic biological and physical sciences, anthropology, psychology and pedagogy, to name only a few of their special academic resources. Quite apart from the disadvantage of duplicating posts for our short supply of scholars it is believed that Canada cannot afford a medical centre that is unable to draw upon the broad academic resources of a well developed but not necessarily large university. Even if the university is not in one of the largest metropolitan centres, this would not be so great a disadvantage as formerly when there was complete dependence on the large city hospitals or the heavily endowed charity hospitals for indigent patients and on their private pavillons for good teachers.[1] In fact, on educational grounds, as pointed out in

[1] Dock, Wm., "Curiosity, Culture and Curriculum", *Journal of American Medical Association*, 172:643, 1960.

Chapter 2, there is a definite disadvantage to basing the clinical undergraduate experience entirely in such a setting. There are positive values in relating a significant part of clinical teaching to a cross-section of the entire community.

Only in the university setting may a close relationship be developed at both undergraduate and graduate levels between the various specialists who comprise the modern health team and the research groups that make modern medicine possible. In addition to such familiar categories as nursing, pharmacy, clinical psychology, rehabilitation, laboratory technology, and library science, there are other fields from which assistance will increasingly be drawn because of their growing relevance to modern medicine. Academics whose collaboration is now being sought include the new brands of molecular biologist and geneticist, histochemist, biophysicist, and electronics engineer, the social scientist specializing in health matters, the systems analyst, the experts in public administration and in community development, and the research worker in education itself. Even teachers in the humanities have been pressed into service in several American universities because of new programmes calling for their help in seminars for medical students and faculty. In short, more than ever before, good medicine in its broadest sense depends upon the diversified scholarship of the modern university.

COMMUNITY PARTICIPATION IN PLANNING

Among the citizenry of the community there should be a good level of understanding of the reasons for building a new medical school and the benefits to be derived from it. The leaders of the community should be aware of the predictable costs and strains inevitable in the undertaking. Such an understanding may be achieved in the course of conducting a broadly based study of the needs of the region, its resources and the implications of various steps that might be taken. This study is considered to be so important that it will be discussed in detail under Preliminary Survey by an Advisory Group.

GOVERNMENT SUPPORT

Community interest and backing should be sufficiently substantial and articulate to win support from government at all levels – municipal, provincial and federal. Governmental policy will be most effective when it reflects intelligently directed public demand. On both sides there should be full awareness of the implications of establishing a modern university medical centre. This is now so expensive an undertaking that no university should embark upon it without the assurance of adequate provision for both capital outlay and operating costs. At the same time there should be sufficient grasp of current requirements in medical education by government that grants would be conditional upon planning of the type just described.

Government support should be assured also at the level of the provincial hospital services commission. As described in Chapter 6 it is essential to have

university control of 10 teaching beds per final year medical student as well as an active service for ambulatory patients, (see also section on Teaching Hospital Facilities).

EDUCATIONAL RESOURCES

There should be an adequate flow of students from secondary schools to university to meet the requirements of competing fields. An appropriate proportion of these should come from smaller communities if rural areas are to be better supplied with physicians. Only 15 to 25 per cent of the medical students at the universities of Manitoba, Toronto and Montreal come from homes outside the metropolitan areas in which those institutions are situated. A survey of nearly 18,000 American and Canadian doctors revealed a tendency for them to practise in communities approximately the size of those in which they had grown up.[1] Diehl reported in 1951, in a review of University of Minnesota graduates over a period of 15 years, that a student from a rural community was more likely (by two and a half times) to practise in a rural community than one who had grown up in a large city.[2]

The Questionnaire on Medical Practice, 1962, showed that 30 per cent of Canadian-born doctors reporting lived in communities of less than 10,000 when they started medical studies.[3] Nearly half of these began their first practice in communities of that size; but only one in five of those coming from larger communities went to places with a population under 10,000. Judek suggests that an increase in the number of medical students from smaller communities would provide the latter with a larger supply of physicians. Planners of a new medical school should make sure that the recruiting and admission policies, the residence facilities and the arrangements for bursaries and loans in the parent university are conducive to the attraction of students from all geographic and socio-economic sectors of the population to be served by the new school.

The university in which a modern health sciences centre is to develop should have adequate academic strength in the related physical, biological and social sciences. This involves an intellectual climate that fosters an experimental approach to both old and new problems. How is one to appraise these resources in a university being considered for the location of a new medical school? There is no certain measure, of course, but there are some helpful indices to consider.

If an established department in the basic sciences is not active in research and writing, one suspects either a lack in the leadership, a crushingly heavy teaching load or the absence of necessary facilities. It is a good sign if in at least the major divisions of these departments students are recruited for graduate work, and if research grants are received from the standard granting bodies in an

[1] Weiskotten, H.G., and Altenderfer, M.E., *Journal of Medical Education*, 27:1, September (Part II), 1952.

[2] Diehl, H.S., "Physicians for Rural Areas, a Factor in Their Procurement", *Journal of American Medical Association*, 145:1134, 1951.

[3] Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964.

amount that equals or exceeds the teaching budget. No medical school should be established in a university that does not have an active faculty or school of graduate studies with a graduate degree programme in at least two divisions of the physical, biological and social sciences.

Measurement of the quality of experimentation and of receptivity to new ideas is much harder. There is one clue, however, to explore. In the past 10 years there have been revolutionary changes in concepts in biology, chemistry and physics. There is a growing conviction that certain of the older teaching approaches are inadequate for acquainting the student with the relevant advances in molecular biology, energetics and nuclear physics.[1] If in an arts college the teaching in a basic science subject has not changed substantially in 10 years it is unlikely to be suitable for the preparation of professional workers destined to cope with a changing scientific base for the rest of their lives.

The institutions and staffs comprising the modern university health sciences centre should have a clear and sincere sense of mission to the community. There was a time when institutions of higher learning could live in isolation from the affairs of society, but that time has passed. Moreover, medical education cannot perform either its undergraduate or its post-graduate duties without a functional link with community health services. Although a new medical school in today's mould may help a diffident arts or science department to concern itself with the quality of teaching of physical sciences in secondary schools, or stimulate its colleagues in the social sciences to join in an appraisal of the community's needs and resources in health and social services, nevertheless, if the tradition and atmosphere in the university are basically inimical to this approach then it is probably better to attach the medical school to another institution.

The question of the two-year medical school, that carries the student through the two primarily medical science years, will be considered later in the section "The School of Basic Medical Sciences".

SUPPORT OF RELATED PROFESSIONAL BODIES

History affords many examples where the original impetus for the establishment of a new medical faculty has come from the medical profession. The American Medical Association was formed 115 years ago primarily to improve standards in medical education. Similar instances of responsible concern for educational quality could be reported from dentistry and nursing. It is clear too that, perhaps even more than the isolated medical school, the new university health sciences centre must have close working relationships with the health professions in its region. There is every reason, therefore, to engage the local professional bodies at an early stage in the study of the objectives of the new centre and of the new trends in professional education.

[1] Prior, Moody, Dean of Graduate Studies, Northwestern University, Evanston. Personal interview by members of Project Group, June 8, 1962. Re high school science teaching: Jerrold R. Zacharias, Massachusetts Institute of Technology, led the Physical Sciences Study Committee into preparation of new "Science Study Series". See Educational Services Inc., 164 Main Street, Watertown, Mass.; also Chemical Education Material Study News-letter, Harvey Mudd College, Claremont, Cal.; and Times Educational Supplement, May 3, 1963, p. 922 re Biological Sciences Curriculum Study.

Good medical education today is dependent upon the university having control over a small segment of the normal medical care of the community. In the past this proposal caused alarm until it became clear that such an activity would not be expanded beyond the actual teaching and research requirements of the faculty. It should not be developed to balance a salary budget or to permit an individual or department to build a "clinical empire" for the sake of prestige or power. The family care teaching and research unit lends balance to the learning experience of the student, since so much of the rest of the teaching must inevitably have to do with complicated and serious types of disease in patients admitted to hospital; and it may also become an important link between the university centre and a wide variety of family physicians and specialists in private practice.

Perhaps the most important return to the profession for its assistance in teaching will be the promise of improved types of continuing education for all kinds of practitioners, in all the health professions. A reasonable proportion of a new faculty should have experience in continuing education. A vital objective of the modern university health sciences centre should be its programme of continuing professional education, related sensitively to the needs of practitioners by continuous "feed back" from those who are at grips with the problems of practice, and worked out in close co-operation with the professional organizations.

TEACHING HOSPITAL FACILITIES

Although there is not yet in operation a university-owned hospital in Canada, and only some that could be called integrated in the strict sense, reasonably workable arrangements for teaching have been made, in most cases through affiliated and associated hospitals. In some instances the arrangements are far from ideal. The writers of this study would favour in any new medical school in Canada a university-owned hospital as the main base for clinical teaching and research.[1] Other community hospitals and specialized institutions would be included in an affiliate or associate relationship. University ownership is now less complicated in its financial aspects with the advent of universal hospital insurance and with the prospect of a more accurate identification of the extra costs in teaching hospitals. This view is predicated on the adoption of additional financial safeguards for major teaching hospitals as outlined in Chapter 7.[2]

[1] See also Chapter 6.

[2] In the Report of the Royal Commission on Government Organization, Vol.3, p. 195, there are important recommendations regarding the future of hospitals which are administered by the Department of Veterans' Affairs. These hospitals have, for the past 18 years, been closely identified with both undergraduate and post-graduate teaching programmes in Canadian medical schools. The implementation of these recommendations is now being given serious consideration by the Government of Canada and in certain provinces various suggestions are being put forward which relate to new schools or the acquiring of certain veterans' hospitals to strengthen the teaching hospital facilities in existing schools. The group has given some consideration to the problems raised by the implementation of the Report of the Royal Commission on Government Organization and a discussion of this question with certain recommendations will be found in Appendix iv under the title "The D.V.A. Hospitals and their Relations to Medical Education in Canada".

PRELIMINARY SURVEY BY AN ADVISORY GROUP

Reference was made earlier to the value of a broadly based study of the region's need for a university health sciences centre, of the resources available to support it and of the implications of every aspect of the enterprise. The purpose of such a study is not only to win broad community backing for the undertaking. It is the best way to ensure the formulation of objectives in close harmony with the best thinking on all fronts. Willard[1] advises sponsorship of the study by an advisory group chosen for their interest and intelligence. It should include respected representatives from higher education, the health professions, industry, labour, agriculture and welfare organizations. In Canada it would be important for it to have provincial backing although the group should be appointed by the university in consultation with interested bodies.

In arranging for the study the committee should have consultants chosen for their experience in medical education and a broad understanding of the health problems of society. If the consultants do not direct the study themselves they should help the committee to find a suitable director whose team would enjoy the services of such specialists as a demographer, a social scientist, a statistician, and an economic analyst, in addition to a competent medical educator and administrator of medical school programmes. Willard estimates the cost of such a study as likely to exceed $100,000. It might be less in Canada, since a great deal of the information gathered for the Royal Commission on Health Services will serve as a baseline for more detailed, local studies. The project should have among its objectives an appraisal of the health problems and resources of the area; attention to the educational history of the area and the assets and limitations of the university (-ies) under consideration; an enquiry into the current flow of students from the region into the medical and other health professions and the prospect for expansion of their number; the relationship of the proposed venture to other medical education centres, to existing hospitals, to local professional bodies, and in particular to the provincial hospital services commission and such medical care agencies as may exist; an examination of new trends in educational philosophy and their relevance in the setting in question; and finally, the formulation of recommendations to place before the sponsors and the various authorities that will have to co-operate if the venture is to succeed.

Although the initiation of a proposal for a new medical school may arise in a university senate, or in a legislature or medical association, the writers of this study can hardly overemphasize the importance of conducting a study along the lines just described, under the auspices of an advisory committee drawn from interested groups in the community. The use of consultants with experience and broad vision is recommended, and above all the taking of sufficient time to

[1] Willard, Wm. R., "New Medical Schools: Some preliminary Considerations," *Journal of Medical Education*, 35:93–107, February 1960. As Vice-President and Dean, University of Kentucky Medical Centre, at Lexington, Kentucky, Dr. Willard has been at the heart of perhaps the most promising examples of medical education development along the lines espoused in this report. The report cited covers the findings of a group convened by the Association of American Medical Colleges to study, with the support of a grant from the W.K. Kellogg Foundation, the questions and problems to be resolved before opening a new medical school.

examine in depth the principles involved. Considerable literature has grown up in the past decade dealing with all of the topics mentioned. A planning group should refrain from borrowing the conclusions of others but rather should examine all the evidence critically so that its members themselves would experience what might be called tritely an education in medical education. Their report would then reflect the considered opinion of leaders in the community, intimately familiar with the issues to be faced and sophisticated in their understanding of experience elsewhere. The document would serve for many years as the basic charter for a new enterprise in which all sectors of the public felt they had a real investment: a university health sciences centre, developed by the community to serve the community.[1]

A CANADIAN CONFERENCE

Practical benefit and intellectual stimulus would accrue to the planners of Canada's next new university health sciences centre if they were to set the stage for a meeting of minds drawn from settings where vision and experimentation have been productive. Quite apart from making sure that the over-all objectives were clearly stated and would accomplish what was desired, such a conference would permit a review of the many recent architectural developments. It is essential that the design of teaching, research and service facilities in both medical school and hospital reflect the best judgment of those who have used new approaches elsewhere whether in the United States, Britain, France, Scandinavia, Israel or Russia.

THE LOCATION OF NEW FACILITIES

NATIONAL AND PROVINCIAL CONSIDERATIONS

This study has reiterated the view that the medical colleges and other institutions for training health personnel are becoming more and more interdependent in their teaching, research and service functions. Increasingly they must relate themselves to the region or to the country as a whole. Moreover, by accepting large numbers of men and women from overseas countries for both basic and

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[1] A good example of a broadly based study that shaped the founding of one of North America's most functionally attractive teaching centres is reported in the series *Planning Florida's Health Leadership*, University of Florida Press, 1954–55. The five volumes in the Medical Center Study series are entitled *Florida's Doctors at Mid-Century*, *Health and the People in Florida*, *Florida's Hospitals and Nurses*, *Medical Education in the University*, and *Summary*, (ed. L.J. Malouf). From it arose the J. Hillis Miller Health Center on the campus of the University of Florida at Gainesville, Florida, opined in 1956 with Russel S. Poor as Provost and Geo. T. Harrell as Dean of the College of Medicine. There are also Colleges of Nursing, Pharmacy and Health Related Sciences. See also Lee, Peter V., *Medical Schools and the Changing Times*, Evanston, Association of American Medical Colleges, 1961. Chapter 5 contains an account of this development at the University of Florida.

Other studies, on the United States as a whole, Maryland, the Western States and on California, are cited in Chapter 11 in the section on Requirement of Physicians. Others have been on Michigan, New Mexico and elsewhere. The most recently published survey is of particular interest for its breadth of scope —— *Education for the Health Professions*, a report to the Governor and Board of Regents from the New York State Committee on Medical Education, June 1963. (Copies available from the Board of Regents, New York State Education Department, Albany, New York.)

advanced training, and by providing more and more Canadian physicians, nurses, therapists, et al, for service abroad, these institutions have become a critical link in implementing Canada's foreign aid policy and in providing a medium through which the international responsibilities of Canadians may be met.

On these scores Chapter 7 argues for substantial federal as well as provincial grants towards the capital and operating costs of university medical centres. Nevertheless, since both education and health are involved, the ultimate decision to build new centres must be made by the provincial governments and the universities or colleges themselves. For this reason it would be presumptuous to designate here the specific institution, or even the sector of a province, in which the "crash programme" of new medical school planning, as outlined in the last chapter, must begin. A strong plea is made, however, for recognition of the urgent need to create new facilities, to plan them in a co-ordinated manner and to ensure the breadth of objectives and the concern for quality necessary to guarantee that the investment will be in the public interest.

The need to plan immediately for new facilities to forestall a grave shortage of physicians in Canada in the 1970's was set forth in Chapter 11. In addition to increasing considerably the intake of students in existing institutions and opening the new medical school in Sherbrooke in 1967-68, it appears necessary to create in the following five years, including 1972-73, new places for 288 first-year medical students (Table 11–14). Four new schools were postulated, opening in successive years from 1968-69, starting with 48 students and increasing in one year to an intake of 64 (or three schools if larger classes were found to be feasible). From then on, if earlier assumptions about population growth and physician migration proved to be correct, the country would still need a continuing expansion of its total first-year medical class by an increment of 32 students annually.

PLANNING AND BUILDING SCHEDULE

It takes from eight to ten years to plan and build a medical school with its clinical facilities, to recruit staff and put through the first undergraduate class. The following schedule to produce graduates in 1972 (four-year professional course) is conservative: if the decision to embark had been made before the end of 1963 the dean might be appointed for full-time duty by June 1964. The next 12 months would be occupied by examining other medical schools, meeting with advisory groups, planning and holding a conference on objectives and policy. Planning of both medical building and hospital would have to get under way by mid-1965; construction of the former would extend over 1966-68, and the hospital would require 30 months for completion by July 1969. The search for key basic science staff should begin early in 1966 for appointment by July or September 1967. They would be on hand to plan and to visit other centres for one year prior to the reception of first-year students in September 1968. This period of a year of "shake down" is essential to curriculum development.

Clinical department heads should be appointed as early as possible in 1968 in order to assist in the preparation of the clinical facilities and to receive second-year students on the wards no later than January 1970. This schedule is within

the realm of feasibility only if the financial base of the enterprise is secure. A shortage of capital funds has frequently delayed the completion of construction by one to several years.

LOCATING NEW SCHOOLS

The decision to build a university health sciences centre in a particular area will rest undoubtedly on a cluster of factors. One of these is a shortage of physicians in relation to a rapidly growing population. Judek[1] has emphasized the likelihood of graduates remaining in the region of their medical school. Other studies have emphasized the influence of the internship on the location of practice.[2] Another reason for a school would be the existence of pressure from qualified applicants who have been refused entrance to other schools. The need for further base hospitals or major consultation service may also add impetus to the movement. A community may seek a medical education centre because of its favourable influence on the standards of health care in all its aspects. In Canada, particular attention will have to be given to differential rates of population growth, of urbanization and of expansion of universities capable of accommodating a health sciences centre. All possibilities will have to be assessed in relation to the necessary conditions just described.

Without documenting the arguments at this point there would seem to be a clear balance in favour of planning new schools in both Ontario and Quebec. Although all new schools should strive to be experimental in their approaches one would hope that at least one school teaching in English and one in French would be frankly radical in exploring some of the very promising new approaches to curriculum described in Chapter 2. The next school in the Atlantic region, either English- or French-speaking, might well direct its efforts towards a special assessment of rural community needs and an inventive approach to them. Two-year schools, to be discussed later, might play an important part in such innovations.

THE PHYSICAL SITE

To graft a new medical school to an already fully developed community general hospital with its vested interests and moulded patterns of thought would be regarded by most medical educators as a grave mistake. It would be equally serious to confine the development of a new medical school to the model of the faculty of medicine of the past.

It is hoped that previous chapters have made clear the point that education for the health professions for the future requires a closely meshed cluster of functioning units, with various interests which may stretch from basic research in human biology to evaluation of the methods of health education in the rural community; from the training of technicians in radiography to preparation of a gifted

[1] Judek, *op.cit.*, Chapter 4.

[2] Weiskotten, H.G., *et al*, "Trends in Medical Practice — An Analysis of the Distribution and Characteristics of Medical College Graduates", 1915–1950. *Journal of Medical Education*, 35:1071–1121, 1960.

medical graduate for a second doctorate in experimental surgery. These considerations have an obvious bearing on the selection of the physical site of a new centre.

Dock[1] would avoid the congestion of the large city unless the centre is "a village" within it, possessing residential and recreational facilities. In future, he suggests, one criterion in evaluating a teaching centre might be the percentage of full-time faculty living within two miles of where they work with their students and patients!

"The site should reflect the medical center as a satellite within the university orbit."[2] Ideally it would be on the periphery of the campus, the schools of medicine and nursing being within easy walking distance of the arts and science faculties and, if there is one, of the continuing education or extension centre of the university, particularly if it has a residence and class rooms. The hospital side of the centre should be able to take advantage of transportation facilities including a helicopter landing area. Even the direction of the prevailing wind is of interest in the locating of animal quarters, incinerators and certain radioactive isotope laboratories. Quarters for married students and hospital staff could be considered; there should be recreation facilities for paediatrics and rehabilitation patients, and space for the development of specialized hospitals or units, e.g., children's day nursery, family care or model community health centre (serving the campus families but invaluable educationally), and psychiatric, chronic illness, geriatric and rehabilitation units.

This list may appear to be extravagant but each item is regarded as an essential component by a number of centres and many others wish they had the space on which to put them all. The plea is made here, when the opportunity offers, to plan with the possibility in mind of expanding original units and of constructing others, the whole to be related intimately to the university, but with access from the community. The goal of the late Allan Gregg of "bare headed walking distance" should be sought whenever possible. It is well if the hospital and medical building are joined in one structure, with the less cognate parts no farther than 10 minutes walk away. "An average size site, to provide growth over a 20-year period, should be in the range of 75 acres, with a minimum of 35 acres. Some schools in the planning stage are thinking in terms of sites with 250 acres."[3] The new site for the Ninewells Hospital and the Dundee Medical Centre has 200 acres.[4]

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[1] Dock, *op.cit.*

[2] U.S. Public Health Service, Public Health Service Publication No. 875, *Medical School Facilities: Planning Considerations and Architectural Guide*, Washington: U.S. Government Printing Office.

[3] Harrell, Geo. T., "Planning and Construction of a New Medical School," *Journal of Medical Education*, 37.1, January 1962.

[4] *Hospital and Medical School Design*, ed. Geo. H. Bell, *op.cit.*, p. 39.

THE SCHOOL OF BASIC MEDICAL SCIENCE

Canadian experience with the so-called "Two-Year Medical School" began at the University of Alberta in 1913. Ten years later the full course was given. The School of Medical Science at the University of Saskatchewan from 1926 to 1955 received students for the study of medicine who had completed two or three years in the College of Arts and Science. After two years of medical subjects, when the B.A. degree was awarded, the students were transferred to other Canadian medical schools for the third and fourth years. In 1955 and 1966 these clinical years were added and M.D. degrees were granted in 1957.

Of the many two-year programmes existing over the years in the United States, only three have not gone on to become four-year schools. One might say that with the exception of Dartmouth Medical School in New Hampshire it is only the force of circumstances that has prevented the two-year schools from moving into the full programme. The tendency has been to look on them as a compromise arrangement giving the college students of a particular region a better opportunity to begin the study of medicine.

Arguments against the two-year school have included the difficulty of obtaining good faculty and facilities, the problem of presenting an adequate clinical orientation, difficulty in some instances in getting the students placed elsewhere for their clinical years, and the diminished influence that such a school can exert on medical care standards in its community. Willard has warned that "although a two-year school is cheaper than a four-year school, there is a danger that the financial requirements of a two-year school will be underestimated, with a concomitant sacrifice in quality".[1]

In recent years the spectre of a serious shortage of physicians has induced a number of states to consider the two-year school as partial solution. They have noted that openings in the clinical years exceed the output of students prepared in the years devoted to basic science. This is due partly to attrition from failure at examinations, or from change of interest during the first two years of the medical course, and partly due to the comparative abundance of opportunities for clinical teaching. It might be corrected by increasing the admission to the pre-clinical years, made possible by the provision of more facilities for laboratory training. More important, however, has been a fresh argument advanced on educational grounds. This has sufficient merit in it to warrant discussion.

Attention was directed in Chapters 2 and 3 to the efforts of certain universities to integrate the basic "pre-medical" experience with study in the specifically medical sciences.[2] To the extent that this could be a continuum in the learning process, with the student gaining each year an experience in greater depth in his subject, it would present clear advantages in terms of educational quality. This would be still more the case if much of the work were at the usual level of graduate

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[1] Willard, W.R., *op.cit.*, pp. 98–99.

[2] As at Johns Hopkins, Stanford, Northwestern and McGill universities. See also Lee, Peter V., *Medical Schools and the Changing Times*, Evanston, Illinois: Association of American Medical Colleges, 1962.

studies. The argument for the distinctive academic opportunities of the two-year school has been put forward well in the case of Dartmouth.[1] This institution has enjoyed an enviable reputation for the quality of both students and instruction. Although linked with an excellent teaching hospital in which second-year students are introduced to clinical subjects, Dartmouth has resisted pressure to expand to a full four-year programme. Its emphasis on research has induced an increasing proportion of Dartmouth students to move, after completing second-year medicine, into a Ph.D. course in one of the basic sciences. As many as 25 per cent did this recently; an admirable pathway to medical science teaching.[2]

A similar development is the Division of Médical Studies (not a new *school*) at Brown University where the basic physical and biological sciences, along with behavioural and social sciences and courses in the humanities, will be taught in orderly sequence throughout the six-year period after junior matriculation. This will lead after four years to the A.B. and at the end of the sixth year to a master of medical science degree. Two-months summer sessions throughout the period will be provided.[3]

Most of the new plans for two-year schools in the United States aim at a specially integrated experience in human biology or the life sciences, with major emphasis on the biological and physico-chemical aspects. It would be quite feasible and reasonable, however, to plan a similar approach with emphasis on community health problems as an integral part of the development of society. Built around a research programme in the assessment of health needs, and around operational studies in medical care and in the dynamics of public administration, such a course might prove useful as preparation for many types of medical administration as well as for leadership along new lines in both teaching and medical practice. Students proceeding from such a course to complete their clinical years at other universities would introduce a novel and possibly stimulating academic background.

In the past decade, therefore, the concept of the two-year school as a provisional measure to recruit medical students from a particular region has been superseded by the idea of its opening up new and possibly better educational experiences. Whether it is in fact a school of medical sciences or an honours course in the arts and science college, it does offer an opportunity to experiment with new sequences in subject matter and the seminar methods of the faculty of graduate studies. "Graduate teaching in human biology . . . would become a living bridge between the ever-expanding physical, chemical and social sciences and the phenomenal demands of the medical and health services of the nation and the world. The newer concepts of health and of medical research and of professional education embrace philosophy, economics, anthropology and mathematics in varying degrees. The creation of integrated investigations and instruction in

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1 Tenney, S.M., *Journal of Medical Education*, 35:553–557, 1960.

2 Tenney, S.M., quoted in *Medical Education and Research Needs in Maryland*, Baltimore,: Maryland State Planning Commission, 1962, p. 45.

3 The Bulletin, American College of Physicians, *The Division of Medical Studies at Brown University*, March–April, 1963, p. 102.

human biology would put added emphasis on the development of broadly trained leaders for the next generation of medical teachers and practitioners."[1]

It is hoped that at least one Canadian university, if unable to offer a full medical course, will see a challenge in this kind of venture. With good students selected from the swelling pool of applicants and a strong, imaginative faculty, there should be no difficulty in placing the students elsewhere for the clinical years. In any case, existing schools should be canvassed by the Association of Canadian Medical Colleges to ascertain the number of students that could be received in the clinical years should their basic medical science preparation be provided in other universities. Trustees, faculties or provincial governments desirous of looking into the possibility of establishing this portion of the medical course should consult the statement prepared jointly by the Council on Medical Education and Hospitals of the American Medical Association and the Association of American Medical Colleges.[2] The Association of Canadian Medical Colleges and the library staff of the Canadian Universities Foundation should prepare an index of literature pertinent to this and other aspects of the planning of new facilities for medical education.

RESOURCES REQUIRED FOR EDUCATIONAL EXPANSION

Increase in the output of trained health personnel may be accomplished by suitable expansion of existing teaching facilities and by the creation of new units. It is convenient to discuss requirements in both of these categories under the general headings of (1) cost of construction of facilities, (2) operating costs, (3) library services, and (4) supply of teachers.

CONSTRUCTION COSTS

Expansion of Present Facilities

In 1962 the deans of medicine were requested by the Association of Canadian Medical Colleges to report on the plans for construction of new facilities in the medical schools and in the major hospitals affiliated to them for teaching. A special effort was made to segregate the cost of facilities for medical research from those for teaching and for clinical or laboratory service; a distinction often difficult and sometimes impossible to make. Information was sought also on the size and character of the new construction, on the distribution of costs between structure and fixed equipment and on the desired staging of financial support

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[1] Rappleye, Willard C., *Critique of Report on Medical Education*, in Medical Education and Research Needs in Maryland, *op.cit.*, p. 106.

[2] *Functions and Structure of a Modern School of Basic Medical Sciences*, revised 1958. Obtainable from Council on Medical Education and Hospitals of AMA, 535 N. Dearborn St., Chicago 10, or Association of American Medical Colleges, 2530 Ridge Avenue, Evanston, Ill.

needed over the years 1963–1967. Building projects were to be classified also according to the stage of planning: (1) construction under way in 1962–63, with financing complete either in that year or later; (2) projects with plans complete but construction not yet started; (3) plans in preparation, and (4) intention to plan within five years if funds were available.

The findings of the survey are summarized in Table 12–1.[1] Omitting the fourth category (new facilities to be planned within five years if financing feasible) there were 31 projects for construction, 18 in universities and 13 in teaching hospitals. Estimates of construction costs, made in 4 cases by building contractors, in 12 by architects and in 15 by officials of universities or hospitals, totalled nearly $154 million. This included the new medical school and hospital for l'Université de Sherbrooke and the hospital for the health sciences centre at the University of British Columbia.

TABLE 12–1

COST OF CONSTRUCTION OF NEW FACILITIES IN CANADIAN MEDICAL SCHOOLS AND TEACHING HOSPITALS, 1963-1967 WITH SPECIAL REFERENCE TO MEDICAL RESEARCH, 26 NOVEMBER 1962

	No. of projects	Total cost	Research cost
		$	$
A. *Universities*			
1. Under construction 1962–63	2	3,160,000	2,244,000
2. Plans completed	2	2,035,000	1,194,800
3. Plans in preparation	14	54,922,175	24,757,275
4. To plan within 5 years, if funds available	9	32,975,000	20,780,000
Total		93,092,175	48,976,075
B. *Hospitals*			
1. Under construction 1962–63	1	1,701,783	46,000
2. Plans completed	2	27,700,000	2,762,500
3. Plans in preparation	10	64,440,675	6,043,200
4. To plan within 5 years, if funds available	1	3,500,000[1]	–
Total		97,342,458	8,851,700
Totals, universities and hospitals		190,434,633	57,827,775

[1] Does not include the University Hospital for Laval and a number of hospital projects in various centres. The former is estimated at $20 million.

Source: Memoranda of November 26 and December 12, 1962, submitted by the Association of Canadian Medical Colleges to the Chairman of the Committee of the Privy Council on Scientific and Industrial Research.

[1] Communications from the Association of Canadian Medical Colleges to The Honourable Gordon Churchill, Chairman of the Committee of the Privy Council on Scientific and Industrial Research, November 26 and December 12, 1962. These estimates were included also in the Brief submitted by the Canadian Universities Foundation to the Government of Canada in May 1963 on the financial requirement for bigher education.

An additional $36.5 million was estimated for ten projects to be planned within five years if funds could be assured. These did not include the new university hospital for Laval or a number of projects for hospital expansion in other teaching centres. At the same time they may include some projects which later judgment would allocate to the quinquennial period beginning in 1967–68. In any case, one can accept as a reasonably conservative estimate the requirement of $95 million to improve and extend the existing medical school facilities (and, laber, Sherbrooke) during the years 1963–1967. Of this, about $50 million would be required for research purposes. The corresponding requirement for teaching hospitals would be over $100 million, of which at least 10 per cent would be for research. In round numbers, the cost of construction envisaged in universities and hospitals (including the new unit at Sherbrooke but no other new medical schools) for medical education and its related research is of the order of $200 million, of which up to one-third would be for research.

The submission of the Association of Canadian Medical Colleges was primarily to seek federal grants for the construction of research facilities in both medical schools and teaching hospitals. A staging of annual requirements for the projects described was proposed as follows:

1963–64 – $5,000,000	1967–68 – $9,000,000
1964–65 – 6,000,000	1968–69 – 8,000,000
1965–66 – 7,000,000	1969–70 – 7,000,000
1966–67 – 8,000,000	1970–71 – 6,000,000

If an acceleration of these developments should be necessary, for example, to produce and hold more medical science and clinical teachers, then an annual requirement of $8 million for most of this period may be a more appropriate objective for the research component. The total construction bill, including hospitals, would then be about $24 million annually. Proposals for the allocation of such costs between federal and provincial governments and other agencies are presented elsewhere in this study. Although it will be necessary for financial strategy to separate the cost of construction in hospitals from that in universities it is essential that all the developments in any one centre proceed in a coordinated, balanced manner.

What would the above investment contribute in the way of increased health manpower? A precise answer, unfortunately, cannot be given. As seen in Tables 11–6 and 11–14, an increase in medical student intake from 1,057 in 1962–63 to 1,342 in 1969–70 is envisaged if one includes the University of Sherbrooke but excludes New School Number One postulated to open in 1968–69. If the capital expenditure of $200 million were related only to the reception of 285 additional medical students it would come to about $700,000 per place in the first-year class. This is a little more than double the unit cost of building a new medical school and teaching hospital to accommodate a class of 64, as will be seen in the next section. In fact, however, the improvements proposed are primarily to improve the quality of all the activities in which the modern university medical centre engages. This will be reflected in greater efficiency in training all types of

health personnel and in strengthening the research effort on a wider front. It may also create the circumstances that will enable Canada to retain a larger proportion of its talented graduates to give leadership in teaching, in research and in medical activities generally.

It is pertinent to ask why Canada should contemplate the construction of new teaching centres when 7 of the present 12 university schools have indicated a maximum student intake, with existing facilities, of only from 60 to 85 (average 70) (Table 11–5). If the intake in all of these could be increased to 100 then this would reduce the number of new schools required by three. The explanation is twofold. Several of these schools exist in communities that are still borderline from the standpoint of the volume of clinical work under educational control. As the technique for basing clinical teaching on the normal medical care of a community is perfected this disadvantage will diminish. By far the greater obstacle is the fact that many of these schools were designed for classes of their present size. When a school has been planned for subsequent expansion, then the expansion of that school is the logical step to take before building a new one. However, to expand a plant built for a class of 60 students to accommodate a class of 100 may cost more than to construct a new medical school.[1] In addition, two strategically situated medical schools with a strong sense of mission may well do more for the public than a school twice as large trying to exert an influence over a larger area.

A report from one of the American States indicated an over-all cost of $304,000 per additional medical student for the renovation and expansion of existing facilities. On the other hand, estimates of the capital cost of a new school, per first-year student, vary from $233,000 to $300,000. The calculation was not extended to include the other health professions and auxiliary personnel taught in the centre.

New Schools

Since the University of British Columbia opened its medical school in 1950 and the University of Saskatchewan established its clinical facilities in the first half of the nineteen fifties there have been great changes in building costs and in the prevailing concepts of medical education in Canada. Outstanding among the latter has been acceptance of the need for a university-owned or -integrated hospital, staffed by a core of full-time teachers with substantial facilities for clinical investigations including laboratory research. Also significant is the evolution from the concept of the isolated medical school to that of the university health sciences centre with its concern for the training of many types of health personnel and its relation to a variety of community health services. Canadian

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[1] *Physicians for a Growing America, Report of the Surgeon General's Consultant Group on Medical Education.* Public Health Service Publication No. 709, Washington, 1959, p. 52. "The replacement of obsolete structures and the addition of facilities (exclusive of hospitals and research facilities) required for this expansion of 1,060 students will cost approximately $325 million." (i.e. about $307,000 per student).

experience with medical school construction costs, therefore, is of limited value in planning for new schools in the future. Fortunately, a major study of all aspects of planning for expansion in medical education has just been completed in the United States. Its report, in two documents, constitutes the best guidance available in the published literature, and close scrutiny suggests that it is highly relevant to present Canadian requirements.[1]

In quoting illustrative budgets and other data from the American report it is necessary to heed the warning of the sponsors that they are intended to serve as guidelines only. "While figures may indicate a desirable starting point for a new school, some will find them more useful as a goal which they should plan to attain and even exceed during the operation of the first few years. Just as more extensive and expensive programs could easily be justified under some circumstances, under others a satisfactory school could start with less and attain the dimensions suggested after several years of experience and growth."

Estimates of construction costs are based on the 1961 USA average of $30 per square foot (range $22 to $45) which includes built-in equipment but excludes site surveying and improvement, and architects', engineers' and consultants' fees. An annual average increase of 4 per cent in construction costs was noted in recent years. Two schemes are presented: one for a medical school receiving 64 students and the other for 96 students. The central facilities of the former are designed to permit expansion to the larger size at a later date.

Table 12–2 summarizes some of the characteristics of the two types of school and the average cost of construction of the basic science and clinical facilities. The models postulate relatively larger numbers of full-time faculty, graduate students and post-doctoral fellows than any Canadian medical colleges had attained by 1962. Construction costs of approximately $21 million and $25.5 million for a medical school and a teaching hospital are given for the 64 and 96 class schools respectively. Canadian estimates will have to take into account the mounting cost of construction since 1961, the difference between costs in Canada and the USA and the probable necessity for future educational centres in Canada to incorporate facilities for training many additional types of health personnel. For construction in the late 1960's and early 1970's new Canadian units are likely to cost between $25 million and $30 million.

The cost of establishing a two-year school would depend upon the academic resources that would have to be added to the university embarking on such a venture, on the educational philosophy upon which curriculum would be formulated and on the clinical facilities and personnel available for the clinical teaching of second-year students.

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[1] *Medical School Facilities — Planning Considerations* and *Medical School Facilities — Planning Considerations and Architectural Guide*. Public Health Service Publications Nos. 874 and 875, 1961. Washington: U.S. Government Printing Office, these were prepared by the Joint Ad Hoc Committee on Medical School Architecture of the Association of American Medical Colleges and the American Medical Association, and the staff of three divisions of the U.S. Public Health Service. This Report "discusses the role and responsibilities of the medical school and the composition of its faculty and curriculum, presents in architectural and engineering terms the amount and type of space needed for the various medical school activities, and gives cost estimates and the elements in planning".

TABLE 12–2

AVERAGE COST OF CONSTRUCTION OF A FOUR-YEAR MEDICAL SCHOOL AT $30 PER SQUARE FOOT, U.S.A. 1961

Comparison of schools receiving 64 and 96 medical students according to number of faculty and of graduate students, and by basic science and clinical divisions. (Dentistry, nursing, etc., not included)

	Two sizes of school	
	A	B
1. *Characteristics of students and faculty*		
Medical students		
Entering class	64	96
Total	250	370
Basic medical science departments		
Faculty, full-time	35	50
Graduate students and postdoctoral fellows	40	55
Clinical departments		
Faculty, full-time	60	85
Postdoctoral fellows	30	40
2. *Construction cost estimates for*		
Basic science facility (with conventional laboratories)[1]	$6,780,000	$7,980,000
Clinical departments' facility	2,190,000	2,430,000
Total for medical school	$8,970,000	$10,410,000
Hospital[2]	12,000,000	15,000,000
Total	$20,970,000	$25,410,000

[1] Using multidisciplinary laboratories this would be reduced by $3,750 per first-year student, i.e., to $6,540,000 and $7,620,000. The decision to use conventional or multidisciplinary laboratories is not primarily an architectural but a curricular matter.

[2] Hospital costs estimated at $30,000 per bed.

Source: Medical School Facilities — Planning Considerations, U.S. Public Health Service Publication No. 874, Washington (1961), Table 13, modified.

From Table 12–2 it may be concluded that the construction of the basic medical science facilities would cost between $6 million and $8 million. A much lower but undocumented estimate of $2 million is cited in one report[1] and much higher estimates are quoted in another.[2] It should be remembered that in addition

[1] *The West's Medical Manpower Needs*. The Western Interstate Commission for Higher Education, Boulder, Colo., 1959, page 59.

[2] *Medical Education and Research Needs in Maryland*. Committee on Medical care, Maryland State Planning Commission, Baltimore, January 1962, page 47. Dartmouth estimated cost of its new plant and faculty expansion at $10 million ($3 million for basic science building and $1 million for auditorium, library, etc.; balance for endowment of faculty salaries). Brown University expected a $15 million cost, some of it to strengthen programmes to provide support for the two-year curriculum.

to the usual basic medical sciences the two-year school requires instructional facilities in clinical laboratory diagnosis, psychiatry, social and preventive medicine, medical interviewing and physical diagnosis. Quite apart from the needs of teachers in these fields it may be necessary to add conference rooms, examination cubicles, locker space and other facilities for students in the local hospital selected for clinical work.

OPERATING COSTS

The 1961 American study[1] yielded also a set of illustrative budgets for medical schools admitting either 64 or 96 students into the first year of a fully established four-year course. The total operating budgets proposed on the basis of staffing patterns set forth in the report were \$2,683,140 and \$3,313,900 respectively. Salaries comprised three-quarters of the total. These estimates omitted the cost of operating clinics and hospitals but did include library service, residents' staff, student health service, general administrative services and maintenance of the physical plant. In Canadian universities the latter items are seldom included in the medical college budget. If one deducts the appropriate amounts for these then new totals are obtained which may be compared with Canadian figures. The new totals for the two sizes of institutions are respectively \$1,884,540 and \$2,328,720.

Budgets of the 12 Canadian medical schools ranged in 1961–62 from \$740,000 to \$2,403,612 with an average of \$1,091,717 and a median of about \$924,000. Omitting from the count one university with a first-year class of only 39 that year, the remainder fall into two fairly discrete clusters. Seven schools with an average intake of 65 (range 60 to 76) had an average budget of \$882,000 or 47 per cent of the American estimate for an institution of the same size. The four other schools with an average intake in 1961–62 of 128 (range 109 to 152) had an average budget of \$1.5 million, or 65 per cent of that proposed for a 96-student school.[2]

Planners of new medical schools in Canada will wish to have more detailed information about the differences in staffing pattern, in teaching responsibility and methodology and in research activity in schools that have undergraduate classes of similar size but vastly different budgets to support them. Further reference will be made to these points in the next section. Meanwhile it must be reported that in the USA there is grave concern over the widening gap between two groups of medical schools that have come to be known as the "Haves" and the "Have Nots".[3] The former are getting stronger whereas the latter, handicapped by

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[1] *Medical School Facilities — Planning Considerations, op.cit.*, pages 46–50.

[2] First year enrolment in 1963–64 yields the following averages: Group A (eight schools), 68, with range of 48 to 92; Group B (four schools), 136, with range 119 to 162.

[3] Symposium on The Have and Have—Not Medical Schools: Willard, W.R., "The Widening Gap Between Two Extreme Groups of Medical Schools"; Wescoe, W. Clarke, *Cause, Effect and Correction;* Elkins, Wilson H. "The Health of Wealth from Multiple Sources", *Journal of American Medical Association*, 185:367–381, August 3, 1963. *Money and Medical Schools*, Council on Medical Education and Hospitals, American Medical Association, Chicago, 1963.

shortages in faculty, space and matching money, are falling farther and farther behind in the competition for research and training grants, endowments and even public funds. Ranking all schools by total expenditures for medical school operations in 1960/61 it was found that the top ten had five times as many full-time faculty members, but only one and one-half times the undergraduate medical student body and only two and one-half times the total student load as the bottom ten. Most of the latter have been warned by the accrediting body of possible loss of approval – and on educational, not financial, grounds.

It is most important that new schools should not start off with a built-in handicap that would threaten their chances to perform competently in their teaching, research and service roles. The writers of this report agree with the conclusions in 1959 of a group of teachers and administrators as expressed for them by the Vice-President and Dean of the University of Kentucky Medical Center: "The basic budget of a four-year medical school of good quality, even a small-sized school, should be projected at not less than $1.5 million per year. For most schools designed to accommodate 75 to 100 students per class, it would be more realistic to project a basic budget of $2 million to $2.5 million".[1] These amounts would require adjustment for the lapse of years.

"The annual operating cost of a two-year school of good quality would be about $600,000 – $700,000."[2]

LIBRARY RESOURCES FOR MEDICAL EDUCATION AND RESEARCH

More than ever before, medical teaching and scientific investigation are vitally dependent upon ready access to the journals and monographs that report new discovery and contain the record of past experience. With the newer methods of teaching in the health professions,[3] the student relies less on conventional textbooks and more on his own exploration of the "living literature" of medicine, nursing or pharmacy, as the case may be. Unless as an undergraduate the future physician learns to define issues sharply and to master relevant evidence and weigh it critically, he will be handicapped later when confronted by the mass of new information and conflicting advice yielded by the current "science explosion". To a considerable degree the quality of service rendered by the physician of tomorrow will depend upon his skill and judgment in the use of the written word, and his access to it.

The recent lag in expansion of graduate programmes in the medical sciences in Canada was noted in Chapter 2. This may account for a degree of unawareness of certain deficiencies in library resources noted here and there by members of this group. When Ph.D. enrolment increases substantially, as it must to produce

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[1] Willard, W.R., *op.cit.*

[2] *Ibid.*

[3] See Chapter 2.

the new teachers required, there will be a greatly increased demand for bibliographic service. The growth of research in all branches of medicine accentuates the need of greatly strengthened library resources in the medical sciences in Canada.

Although the plight of the medical libraries has been the subject of frequent comment by their librarians there was no documentation of the problem until 1959 when the medical sciences librarian of the University of British Columbia reported on the Canadian situation.[1] On February 9, 1962, on the initiative of the Medical Research Council of Canada, a broadly representative meeting was summoned by the Association of Canadian Medical Colleges. There was general recognition of a serious deficiency in Canadian medical library resources which would get worse as educational facilities for medicine and the other health professions were expanded. Before specific remedial measures could be determined it was agreed unanimously to recommend a survey of the Canadian medical libraries. A description of how this was done, and a general summary of the findings, may be found in Appendix 6.

The report[2] demonstrates that library acquisitions are not keeping pace with expanding programmes of medical education and research; that there is no systematic coverage of the world's literature to make it readily available on demand; that bibliographic services are not available to save the time of scientists in charge of projects; that libraries are badly understaffed in both the professional and non-professional categories, with little possibility of developing new services, such as translation and bibliography preparation, or new skills to exploit, in due course, the newer mechanical methods of storing and retrieving information; and, finally, that budgets in most libraries in almost every category were unsatisfactory.

Three of the recommendations, drawn from the summary of the Simon Report, are significant:[3]

1. "Considering the size of Canada's population and its financial limitations, it would be unwise to attempt to create a new national library of medicine. Better results will be attained by building a nation-wide co-operative service based on existing medical and health science libraries. A country-wide plan for co-operative medical library service should include: (a) measures for strengthening existing medical college libraries and assistance for new libraries as they come into being in the future; (b) the development of a strong and well-organized regional library service; (c) creation of some form of national organization which would initiate and develop co-operative undertakings necessary to the successful operation of all the medical libraries.

2. "The governing factor in the choice of a location for such a national organization is the need for it to be associated with a large collection in the field

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[1] Fraser, Doreen, *Canadian Medical School Libraries and Their Collections*, Bulletin of the Medical Library Association, 48:149–161, April 1960.

[2] Simon, Beatrice V., *Library Support for Medical Education and Research in Canada*, Association of Canadian Medical Colleges, Canadian Universities Foundation, Ottawa: Le Droit, 1964.

[3] See Appendix 6 of this study, Summary, paragraphs 12, 13 and 14.

of its interests. This library should be developed as the central reservoir collection for Canada; minor regional reservoir collections should be created in appropriate medical college libraries, and an auxiliary library service organized in each region to serve the needs of medical practitioners, other health professionals, and hospitals.

3. "There is a serious lack of qualified medical librarians in Canada as elsewhere. To meet this need, a programme of advanced study in medical bibliography and medical library administration should be instituted at an accredited library school where there is already a post-graduate programme leading to a higher degree in Library Science and ready access to a medical library of the requisite size and scope."

Believing that serious deficiencies in the medical science library resources in Canada will handicap the required expansion of educational facilities for the health professions, particularly in respect to medical research, we would urge that full study of the findings of the report *Library Support for Medical Education and Research in Canada*[1] be undertaken by the authorities and agencies concerned; and that joint discussion take place with a view to such co-operative action as may be deemed advisable. Such a group should include, it is suggested, representatives from the Association of Canadian Medical Colleges and Canadian Universities Foundation, Canadian Library Association and its group of medical librarians, Defence Research Board, Medical Research Council, Department of National Health and Welfare, National Library of Canada and National Research Council.

FACULTY REQUIREMENTS

It is necessary to have a norm on which to base modifications of existing medical schools as well as the planning of new ones. The tendency has been to determine staffing policy on the basis of what neighboring medical schools have done. The use of *averages* for the 12 Canadian faculties is to be deplored because of the disparity in both size and setting. For example, McGill and Toronto have more circumstances in common than either has with Manitoba or will have with Sherbrooke. Some of Dalhousie's problems are more similar to those of Vermont than to any others in Canada. The four Western medical schools are more analogous to a group of small-to-medium size state universities in the middle and farther West than they are to Queen's or Laval. So far, the best theoretical standards in ultimate staffing policy that the authors of this study can put forward, with several reservations, are those of the study group sponsored jointly by the U.S. Public Health Service, the Council on Medical Education and Hospitals of the American Medical Association and the Association of American Medical Colleges.[2]

Table 2–4 reproduces proposals of this American group for "assumed faculty, graduate students and postdoctoral fellows for a four-year medical school".

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[1] Simon, B.V., *op.cit.*

[2] *Medical School Facilities – Planning Considerations, op. cit.*, page iv.

Two sizes are considered – entering classes of 64 and 96 students respectively. The level of 35 basic science full-time teachers for a 64-student school is regarded as inadequate for the relatively larger responsibilities assumed by most Canadian faculties of this size for teaching non-medical students (Table 2–2). This component of work is increasing steadily and is expected to do so in rough relation to general university enrolment. Moreover, with the increment in medical student intake proposed for Canadian schools as a whole it is expected that our eight schools with an average intake of 65 students, (henceforth known as Group A schools), will move about halfway towards the 96 average.[1] In the projection that follows, Table 12–3, an average of 40 basic science teachers is regarded as minimal. On the other hand, the objective of 60 full-time teachers in clinical departments (excluding Pathology but including Preventive Medicine) is higher than the authors of this study would recommend at present. We are committed to the principle of a substantial core of either strict or geographic full-time teachers in the clinical subjects; at the same time we would use a larger number of part-time teachers than is the goal in many American schools. An increase from the 1961/62 average of 28.1 to 45 clinical full-time teachers is postulated to meet the needs of the immediate future.

The four remaining medical schools (Laval, Montréal, McGill and Toronto), henceforth designated Group B, had an average first-year class size of 128 (range 109 – 152) in 1961/62.[2] The PHS-AMA-AAMC proposals for a 96-student school, with 50 basic science and 85 full-time clinical teachers, are obviously not applicable to a school receiving 152 students. In the considerably larger Canadian schools Table 12–3 reveals corresponding staffs averaging 41.5 in basic sciences (range 26–60) and only 40.5 in clinical departments (range 8–83); one-half of the norm for a considerably smaller school. It must be stated that plans to expand full-time staff in some of these departments are developing. Nevertheless in all the clinical departments in Canada there were only six additional full-time posts in 1962/63; although with vacancies reduced from 25 to 12 there were 19 additional teachers. It is clear that this sector of the faculty with its important responsibilities in clinical investigation should be expanded much more rapidly.

It is even more difficult to predict the future work load of the four larger medical schools. We assume that Laval and Montreal will come to play the same type of role in graduate work and research as seen at McGill and Toronto. All four will have enlarged responsibility for the production of teachers for new medical schools. The projection in Table 12–3 envisages an increase in average number of medical science teachers in Group B schools from 41.5 to 60, and on the clinical side from 40.5 to 85. Overall, this is an enlargement of existing faculties by one-quarter in the basic sciences, and by three-quarters in the full-time clinical posts.

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[1] In 1963/64 the eight schools of Group A received 540 of 1,086 first-year students in Canadian medical schools; an average of 67.5, with range of 48 to 92. Source: reports to Association of Canadian Medical Colleges.

[2] In 1963/64 the four Group B schools received 546 first-year students; an average of 136, with range of 119 to 162.

TABLE 12-3

ESTIMATE OF ADDITIONAL FULL-TIME TEACHING POSTS REQUIRED IN TWELVE EXISTING AND IN FIVE NEW MEDICAL SCHOOLS IN CANADA, 1964/1971. PRESENT FACULTY SUPPLY AND NORMS FOR EXPANSION ARE ARRANGED ACCORDING TO ACADEMIC DIVISION AND CLASS SIZE.
GROUP A: 8 SCHOOLS, AVERAGE CLASS 67.5, RANGE 48–92[1]
GROUP B: 4 SCHOOLS, AVERAGE CLASS 136, RANGE 119–162
NEW SCHOOLS: 5, INCLUDING SHERBROOKE, 64-STUDENT CLASS: ONE TO OPEN EACH YEAR FROM 1967/68

Academic divisions and projection categories	Numbers of Faculty			Total new faculty posts
	Group A (8 schools)	Group B (4 schools)	New schools (5)	
Basic medical sciences				
Total faculty posts in 1961–62	273	166	–	
Average per school	34.1	41.5	–	
Range	26–47	26–60	–	
PHS–AMA–AAMC proposal	35	–[2]	35	
Norm adopted	40	60	32	
Deficit per school	5.9	18.5	–	
No. of posts required in group	48	74	160	282
Clinical division				
Total faculty posts in 1961–62	225	162	–	
Average per school	28.1	40.5	–	
Range	14–53	8–83	–	
PHS–AMA–AAMC proposal	60	–[2]	60	
Norm adopted	45	85	35[3]	
Deficit per school	16.9	44.5	–	
No. of posts required in group	135	178	175	488
Total new posts in basic science and clinical divisions				770

[1] Based on 1963–64 registration.
Earlier definitions of Groups A and B used data for 1961–62, when average enrolment was 60.4 and 128, respectively.

[2] The American study committees' proposals were for schools of 64 and 96 student class size. For the latter, 50 basic science and 85 clinical teachers were suggested.

[3] This target of 35 is for only the first stage of the new school's evolution. In due course it should rise to 40 or 45.

Source: Data from questionnaire, Royal Commission on Health Services. *Medical School Facilities—Planning Considerations*, Public Health Service Publication No. 874, 1961.

The new schools are projected for a class of 64, although this may be reached in one or two stages. It is hoped that all of them would allow architecturally for the possibility of further expansion. A medical science faculty of 32 is postulated for the first stage only. These schools should approach rapidly the

staff ratio of existing schools of that size. On the clinical side a norm of 35 full-time teachers is proposed, somewhat above existing levels in Group A but nevertheless relying substantially on practising physicians as part-time teachers.

These projections for 12 existing and five new medical schools entail the creation of a total of 770 new faculty posts, 282 in the medical science and 488 in the clinical division. This represents an increase over the present number of posts by 64 per cent in the basic sciences and 126 per cent in full-time clinical staff. Nevertheless, this is regarded as a middle-of-the-road approach to the task of equipping existing medical schools and establishing new ones. On the one hand, the projections are made in the light of the trends and values discussed in Chapter 2, and on the other they take into account the resources of the country and the expectations of the public. How quickly and completely these objectives may be attained are questions to which full answers cannot be given at this time.

If the new medical schools were to be opened according to the timetable in Chapter 11 the universities of Canada would have to muster an average of 40 new basic science teachers and 70 full-time clinical teachers a year for seven years, in addition to the replacement of losses of present faculty due to retirement, death and migration. Is this within the realm of possibility? Of the two groups the clinical requirement is the less pressing. Reduction of the present deficit in existing schools could be spread out over a longer period. One might also plan to open the new schools with greater dependence for a time on part-time teachers drawn from the practising profession. Physicians and surgeons of academic competence might be brought in from elsewhere in Canada, or from abroad, to supplement the supply in the community in which the new medical centre would be located. In any case, the problem of providing clinical teachers lends itself to further exploration in several directions with the likelihood of finding a solution. On the other hand, the question of teachers in the medical sciences is much harder to answer and should be examined in some detail.

In 1962 there were 450 medical science teachers in the 12 medical schools of whom 60 per cent (271) were trained in Canada and 55.3 per cent (259) were native Canadians.[1] The future supply of foreign-born scientists is as unpredictable as the supply of immigrant physicians. For this reason, as well as to hold native Canadians by inducing them to take their training in Canada, it is clearly important that the medical science departments in our universities have adequate facilities for graduate work and enrol sufficient candidates for Ph.D. training. Table 12–4 reveals the trend in Canada, and even more strikingly in the United States, towards replacement of M.D. teachers by those who have come up through master's and doctoral training in the sciences. The reasons for this, and its implications, have been discussed in Chapters 2 and 8. Although in the United States the trend seems to have come to a standstill in biochemistry, pharmacology and physiology, it continues in anatomy and microbiology and one has every reason to expect a duplication of this situation in Canada. It is useful to examine its implications for staff recruitment in the six fields in which Canadian medical faculties have experienced the greatest difficulty in making appointments.

[1] See Table 8–4.

TABLE 12–4

ACADEMIC DEGREES HELD BY FULL-TIME TEACHERS IN BASIC MEDICAL SCIENCE DEPARTMENTS IN CANADIAN (1958/59 AND 1961/62) AND AMERICAN (1952/53 AND 1958/59) MEDICAL SCHOOLS

Subject,[1] country and year	Size of sample	Distribution of degrees in per cent				
		(1) M.D.	(2) Ph.D.	(3) M.D. & Ph.D.	(4) Other	Total of (2), (3) and (4)
Anatomy						
Canada, 1958/9[2]	76	63.1	17.1	14.5	5.3	36.8
1961/2[3]		55	19	21	5	45
U.S.A., 1952/3[4]		35	47	9	9	65
1958/9[2]	706	22	67.3	6.2	4.5	78
Biochemistry						
Canada, 1958/9	68	10.3	73.5	10.3	5.9	89.7
1961/2		8	83	6.6	2.4	92
U.S.A., 1952/3	324	4	85	7	4	96
1958/9	685	6.7	85	5.1	3.2	93.3
Microbiology						
Canada, 1958/9	44	56.8	31.8	4.5	6.8	43.2
1961/2		55	27	12	6	45
U.S.A., 1952/3		30	60	7	3	70
1958/9	552	20.5	67.8	5.0	6.7	79.5
Physiology						
Canada, 1958/9	60	38	43.3	15	3.3	64.6
1961/2		45.5	41.5	12	1	54.5
U.S.A., 1952/3	308	25	61	11	3	75
1958/9	567	23.8	61.9	10.2	4.1	76.2
Pharmacology						
Canada, 1958/9	30	40	40	16.6	3.3	60
1961/2		33	50	12.5	4.5	67
U.S.A., 1952/3	241	30	51	17	2	70
1958/9	434	31.8	53	11.7	3.5	69.2
Pathology						
Canada, 1958/9	64	87.5	1.5	7.8	3.1	12.4
1961/2		74	10	13	3	26
U.S.A., 1952/3		82	3	15	0	18
1958/9	626	82.6	9.5	3.6	4.3	17.4

[1] Excluded from this table are data under headings of Biophysics, Biostatistics, Cancer Research, Genetics, Medical Research and Pharmacology-Physiology (a small number of joint departments). Instructors and lecturers are included in columns (2) and (4); excluded in (3).

[2] *Annual Report on Medical Education*, Council on Medical Education and Hospitals, American Medical Association, J. Amer. Med. Ass. 171:1507–1575, Nov. 14, 1959. Tables 8 and 10.

[3] Information reported by medical schools to the Royal Commission on Health Services of Canada, 1962.

[4] Survey information for the First Teaching Institute, Association of American Medical Colleges, 1953. (a) *J. Med. Ed.* 29:Part 2 – July, 1954, p. 130. (b) Hinsey, Joseph C., *Proceedings of Second World Conference on Medical Education, 1959*, New York: World Medical Association, 1961, p. 539–540.

N.B.: Size of sample for Canadian data 1961–62 to be added later.

If 280 medical science teachers are required for new posts then it can be deduced that approximately 50 of these should be in the various branches of anatomy (including genetics and histochemistry), 40 in microbiology and 45 in pharmacology. This is based on first making up known shortages and expanding present departments; next, on staffing new schools with teachers distributed between these three departments according to the proportions now present in existing Canadian schools. (Practically the same ratios are noted in the American proposals for new faculties, in Table 2–4.) But new teaching posts represent only a part of the total requirement of new personnel in these subjects. There is also the general attrition due to death, retirement, emigration and departure from the university to enter industry or other fields. This loss by the university is usually taken to be around five per cent annually. It has not been measured in medical faculties but many would estimate it to be at least double this amount. Nevertheless, an over-all attrition rate of five per cent has been selected for the rough calculation of requirements shown in Table 12–5. In the case of anatomy, this works out to a requirement of 79 new teachers in seven years, or approximately 11 per year.

If this attrition rate were applied annually to each new count of teachers then the compounded requirement to increase the number of filled posts from 82 to 132 at the end of seven years would be 13 new anatomists each year. To the extent that teachers moved only from one Canadian university to another this requirement for the country as a whole would be reduced. For this reason the more conservative, and arithmetically more simple, estimate has been used. *In addition to about 80 new teachers required by 1971 to expand the departments of anatomy, Canada would need about 60 additional teachers in microbiology and about 65 in pharmacology.* Requirements in biochemistry and physiology would be of the same general order of magnitude.

TABLE 12–5

PROJECTION OF REQUIREMENT OF NEW FULL-TIME FACULTY IN CANADIAN MEDICAL SCHOOLS IN 7–YEAR PERIOD 1964/65 – 1970/71 IN THREE BASIC SCIENCE DEPARTMENTS – ANATOMY, MICROBIOLOGY AND PHARMACOLOGY

	Anatomy	Microbiology	Pharmacology
Actual no. of teachers in 12 schools in 1962/3	82	53	59
No. required to meet over-all attrition of 5% per year, for seven years	29[1]	19	20
No. required to fill new posts	50	40	45
Total requirement for seven years	79	59	65
Average no. of new teachers required per year	11	8	9

[1] If attrition at this rate were compounded annually then each year would require 13 new teachers in Anatomy. See text.

Source: Data collected by Royal Commission on Health Services and by Council on Medical Education and Hospitals of the American Medical Association.

How many of these new teachers are likely to be required from M.D. and Ph.D. ranks respectively? Table 12–6 gives two projections of the requirement in these three basic sciences. One is based on the Canadian situation in 1961/62; the other on American findings in 1952/53 which may prevail in Canada before long. The fifth column (total of (2), (3) and (4)) gives the number ot teachers requiring preparation in the biological or medical sciences in the graduate school of the university. At best, the task would be to find in the seven-year period 37 anatomy teachers with the M.D. background, of whom 10 would also have the Ph.D.; 10 would have Ph.D.'s alone and three would have other degrees, e.g., Master's. Altogether, 23 would have received some or all of their special preparation in the graduate school of the university; but it might be as many as 33. Similar ranges are 18 to 28 teachers in microbiology with Ph.D. degrees and around 30 in pharmacology. An annual supply of from three to five new teachers with higher degrees, mostly at the Ph.D. level, would be called for in anatomy, in microbiology

TABLE 12–6

ACADEMIC QUALIFICATIONS OF NEW BASIC SCIENCE TEACHERS REQUIRED FOR CANADIAN MEDICAL SCHOOLS 1964–1971 WITH SPECIAL REFERENCE TO THE NUMBERS LIKELY TO REQUIRE HIGHER DEGREES IN THREE SELECTED MEDICAL SCIENCE FIELDS

Two projections, a and b, are based on previous patterns of staffing: a – Canada, 1961/62 and b – United States, 1952/53[1]

Subject; projection	Number of teachers required according to academic qualifications; two projections					Total staff required
	(1) M.D.	(2) Ph.D.	(3) M.D. & Ph.D.	(4) Other	Total of (2), (3) & (4)[2]	
Anatomy[3]						
a.	27	10	10	3	23	50
b.	17	24	4	5	33	
Microbiology						
a.	22	11	5	2	18	40
b.	12	24	3	1	28	
Pharmacology						
a.	15	22	6	2	30	45
b.	13	23	8	1	32	

[1] These projections are based on data of Table 12–4 which revealed the relative numbers of teachers with M.D., Ph.D. or other degrees in four different series. Two staffing patterns were selected for projection for reasons set forth in text. The number of teachers required in each field was based on existing Canadian faculty ratios applied to the totals derived in Table 12–3.

[2] This column indicates possible numbers of teachers requiring training for Masters or Ph. D. degrees, depending upon extent of trend to appoint more teachers with higher degrees in these medical sciences.

[3] The medical sciences dealt with here were selected because of the greater shortage of teachers in these fields and the relatively smaller numbers preparing themselves for academic work in them.

Source: Questionnaire returns to Association of American Medical Colleges for Teaching Institutes, 1953; and to Royal Commission on Health Services of Canada, 1962. See also Tables 12–3 and 12–4.

and in pharmacology if the above requirements were to be met. This is an admittedly tenuous calculation of the requirement but it is worth while matching it with the known output of medical scientists with higher degrees from Canadian universities.

FACULTY SUPPLY

As mentioned already, there is insufficient information to make a logical estimate of the number of medical graduates, i.e, M.D.'s, trained to teach in the basic medical sciences whether with or without a Ph.D. On the other hand, there is relatively more information on the enrolment of graduate students in the various medical sciences and on the number of Master's and Ph.D. degrees awarded in these subjects each year. About 60 per cent of medical science teachers in Canadian universities in 1961/62 were trained in this country. It is not known whether this applies to both the M.D. and Ph.D. groups of teachers; but if this should be the case then it would be possible to compare the estimated requirement of Ph.D. teachers with the estimated supply to be provided by the schools or faculties of graduate studies. This is attempted in Table 12–7. The attrition of present Ph.D. teachers (1961/62) is calculated at a five per cent loss each year, again in an over-all manner rather than compounded annually. The number of new teachers required in each field is estimated from the distribution of M.D. and Ph.D. degrees in medical science teachers over nearly a decade (Table 12–4). [It is assumed, without any firm basis, that 40 per cent of the Ph.D. teachers will come from abroad even when larger numbers are required.] A further assumption is that the output of medical scientists with Canadian Ph.D. degrees will continue during 1964/5–1970/1 at the rates prevailing in the earlier period, 1957/8–1962/3. For this purpose, the output is measured by the number of Master's and Ph.D. degrees reported by the universities annually to the Dominion Bureau of Statistics as shown in Table 2–3.[1] Allowing for even the most optimistic interpretation *the balance between requirement and supply in the Ph.D. segment of the Canadian medical teaching force is disturbing to the point of alarm.*

The real disparity between the impending need of medical scientist teachers and their supply is apparent in Table 12–7 only if one realizes that the predicted output of doctorates in the next seven years includes specialists in many branches of pure and applied biology. There is no assurance that any particular proportion of them will be available for or interested in appointment to medical faculties. The seven-year balance of nil in anatomy, 12 in microbiology and four in pharmacology does not take into account the following additional outlets for these groups: a) the expansion of teaching facilities in schools of dentistry, b) the appointment of more and more Ph.D. microbiologists to hospital departments of pathology or bacteriology, c) recruitment of staff for the public health laboratories of governments from

[1] From the standpoint of eligibility for teaching appointments in medical science departments a more useful list of graduate degrees would be that compiled annually by the Council on Medical Education and Hospitals of the American Medical Association. Canadian returns, unfortunately, have seldom been complete in this respect.

nearly all of these fields, d) the requirement by industry of increasing numbers of biological scientists, especially pharmacologists and e) losses in all groups due to emigration, premature death, and other causes. Obviously, the deficiency in supply of future teachers in the medical sciences is much greater than the figures in Table 12–7 disclose.

TABLE 12–7

NEW CANADIAN-TRAINED PH.D. TEACHERS REQUIRED IN 7-YEAR PERIOD, 1964/65–1970/71 IN CANADIAN MEDICAL FACULTIES IN THREE FIELDS, ANATOMY, MICROBIOLOGY AND PHARMACOLOGY.[1]
COMPARISON WITH EXPECTED PH.D. OUTPUT IN SAME SUBJECTS.[2]

	Anatomy	Microbiology	Pharmacology
No. of Ph.D.'s on Staff	39	25	39
Requirement[3]			
No. of Ph.D.'s			
Attrition 5% per annum	14	9	14
New posts	24	21	30
Total needed in 7 years	38	30	44
Supply			
Ph.D.'s from abroad	23	18	26
Output of Canadian schools	15	24	22
Total supply	38	42	48
Balance	0	+12	+4

N.B. The above assumes that 40 per cent of Ph.D. teachers may be trained outside Canada. It makes no allowance for the utilization of Canadian trained Ph.D.'s by industry or government; it disregards emigration, deaths or other drop-out among the new graduates.

[1] Based on assumption of expansion of existing medical schools and the creation of four new schools in this period.

[2] The projected seven-year output of medical scientists with Ph.D. degrees is based on actual output for 1956/57 — 1962/63 which Table 2–3 shows to have been stationary in most fields.

[3] See Tables 12–3, 12–4 and 12–5.

Source: Annual returns of Canadian medical schools to Council on Hospitals and Medical Education of American Medical Association; also Dominion Bureau of Statistics.

How grave is the problem of faculty supply and what should be done about it? Until the magnitude of the above elements in the situation has been ascertained it will be impossible to state how seriously the shortage of teachers may threaten the educational expansion that has been described. Should the planning of new facilities be curtailed? Should existing medical schools content themselves with their present supply of staff? Should the new schools try to get along for a while with smaller faculties or with a smaller proportion of highly qualified teachers than Canadian universities have at present? Members of this group would regret the acceptance of any of these measures as the solution to a problem that has not been subjected thus far to full analysis. On the other hand, they would point to steps which in their opinion should be undertaken immediately and with all the urgency of a "crash programme".

NECESSARY STEPS

We urge the adoption of the measures listed below, not only to ensure that the health professions will keep up in numbers with the growth of the population (let alone any increase in the amount of service to be rendered), but also as essential if Canada is to escape an actual deterioration in its present quality of teaching and research in the medical sciences. Many aspects of the problem of producing and conserving scientists undoubtedly require more thorough study, and suggestions to this end will be made later. Meanwhile, a massive attack should be launched to overcome obstacles known now to stand in the way of recruiting and conserving future university teachers in crucial fields of scholarship. Other branches of higher education face a similar crisis, it is realized; but the issue here is whether the future health care of the Canadian people should be handicapped by resting on a less effective educational foundation than now exists.

It was noted in Chapter 2 that the output of Ph.D. graduates in many of the biological sciences relevant to medicine has failed to increase during the past seven years in Canadian universities. The increase in Master's degrees has been at the rate of only 3 per cent per year (Table 2–3), despite the fact that the past decade has witnessed an amount of dramatically significant discovery, probably without precedent in the history of biology. Although a count has not been made it is feared that the recruitment of medical students for later academic roles in the basic sciences has also been lamentably small. Until all the causes of this limited accomplishment have been evaluated it is urged that the following measures be undertaken on an emergency basis to break the vicious circle that appears to inhibit the recruitment of young Canadians for teaching and research in the medical sciences:

1. *Construction of research facilities* (see Table 12–1 and discussion in Chapters 8 and 10). Some departments have had to turn down applicants for graduate study because of sheer lack of bench space. The use of visiting scientists to stimulate interest in their special fields has been poorly developed in most Canadian medical schools because of lack of suitable quarters as well as paucity of funds for this purpose.

2. *Increase in the number and value of fellowships and associateships* as provided by the Medical Research Council and the National Research Council (Chapter 8). New methods of undergraduate teaching to expose students with scientific interest to research cannot be undertaken until larger numbers of post-doctoral fellows are pursuing research in the basic science and in the clinical departments.

3. *Increased grants-in-aid for the support of research*. Other aspects of applications for support being equal, favour should be shown to the applicant best able to arouse scientific curiosity in his students and to attract them into active participation in research. (This need not conflict with the goal of producing more and better practitioners; but it will produce more teachers.)

4. *Increase in the number and value of undergraduate bursaries, scholarships and loan funds* as discussed in Chapter 4. This would permit able students to use summer vacations to accelerate their development of scientific and professional competence.

5. *Self-survey by each university to see if the most dynamic themes in the biological sciences are the subject of active investigation by competent and enthusiastic teachers.* If a deep interest in molecular biology has been aroused in premedical studies then it should be possible to continue this suitably in anatomy, biochemistry or microbiology. An early enthusiasm in enzyme chemistry should find further nourishment in pharmacology or experimental surgery.

6. *Liberalization of the medical undergraduate curriculum* so that able students could undertake elective study in greater depth in subjects of special interest to them. As described in Chapter 2 there is a firm trend in this direction in American universities.[1] Along with other curricular changes this has been accompanied by a swelling movement to follow careers in teaching and research. (At present, in Canada, only McGill offers medical students a full-time elective, in third year, and it is of only one month's duration.)

Of these six emergency steps to enlarge the cadre of teachers for Canada's existing medical colleges and for the new ones that should be planned forthwith, only the last one requires new organizational arrangements that would take time to devise; and this might be called a normal educational responsibility of the faculties. The first four would require the expenditure of considerable sums of money; but again through channels of support either in existence or not difficult to establish. A seventh step follows and an eighth will appear at the end of this chapter.

The above measures to recruit students for academic careers would be of limited avail if other influences militated against their remaining in university work or staying in Canada. For this reason the observations elsewhere in this Report urging adequate salary scales, reasonable teaching loads, suitable library support, etc., are highly pertinent to the supply of teachers. All of these aspects should be encompassed in a broad-gauge study of the staffing of Canadian medical faculties. With additional staff the Association of Canadian Medical Colleges could undertake this in collaboration with the Research Division of the Canadian Universities Foundation which is already engaged in a survey of university teachers.

One of the crucial items to investigate is the migration of teachers to the United States. Together with a similar loss of medical practitioners of all kinds this constitutes so grave a problem that it is dealt with in a separate section. Since any reduction in the emigration of physicians that can be effected will, *pari passu,* reduce the need to expand the output of Canadian medical schools, it is convenient to consider this topic in the present chapter.

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[1] Lee, Peter V., *Medical Schools and Changing Times, Nine Case Reports on Experimentation in Medical Education, 1950—1960.* The Association of American Medical Colleges, 1962, Evanston, Illinois.

CANADIAN PHYSICIANS IN TRAINING POSTS IN THE UNITED STATES

All available data and a good discussion of this topic may be found in Chapter 2 of Judek's study.[1] In 1962, there were 5,718 physicians licensed in the United States who had received medical degrees from Canadian universities.[2] Of these, 1,781 were American born, 456 came originally from other countries, 356 were of unrecorded origin and 3,125 were born in Canada. Of the latter, about one-half had been in the United States at least a quarter of a century. Taking the Canadian-born, Canadian-trained group as a whole, i.e., 3,125, we find that the total number is equal to about one-third of all Canadians graduating in medicine from Canadian universities in the 14-year period 1947/48–1961/62.[3] A drain of this magnitude on the country's physicians raises questions of vital importance to Canadian schools and universities; and indeed, to the general economy. Moreover, a similar loss of talent and of educational investment affects many vocational fields. Key questions to ask include these: How many Canadian graduates go each year to the United States? Of these, how many plan to stay, or intend to return, or are without definite plans? How many in the latter categories decide not to return? What circumstances and motivational influences, either explicit or unexpressed, determine these decisions? What can be done in our own educational arrangements to minimize this loss? At best, only incomplete answers can be given but they increase our insight and they indicate points of departure for further fact gathering.

Of the 3,125 Canadian-born, Canadian-trained physicians registered for practice in the United States in 1962, 568 were first licensed in the decade ending in 1962. If to this number are added 84 foreign-born, Canadian-trained physicians and another 62 whose birthplace was not reported (but omitting 461 American-born graduates of Canadian medical schools) then the total number licensed during the ten years and still in the United States in 1962 is 714.[4] Yet during this period 1,880 physicians from Canada were reported to have emigrated to the United States (Table 11–8). Each year an average of nearly 600 Canadian citizens occupied internships or residencies in American hospitals (Table 12–8), and another group, numbering 72 in 1962, held temporary full-time posts on American medical faculties (Table 12–10). Since Canadian graduates have a good record in passing American licensing examinations[5] it must be the case that a great many Canadian physicians entering the United States as immigrants, or as visitors or students, do not become licensed; or for one reason or another do not retain their registration. Although the flow of immigrants from the United

[1] Judek, S., *op.cit.*

[2] *Ibid.*, Table 2–13.

[3] *Ibid.*, Table 3–5.

[4] *Ibid.*, Table 2–13.

[5] None of 75 Canadian candidates in 1961 failed before the National Board of Medical Examiners. On the other hand, in the same year, of 198 candidates from Canadian medical schools taking state boards' examinations there were 23 failures (11.6 per cent, compared with 2.8 per cent for candidates from United States schools). *Journal of American Medical Association*, 180:848 and 856, June 9, 1962. Cited by Judek, *op. cit.*, Chapter 2.

States to Canada is known, a yearly average of 57 over 10 years (Table 11–8), there is no way to count annually the number of Canadian physicians who return after post-graduate or other work in the United States. Clearly, much more information is needed before one can estimate precisely the present annual net loss of physicians to the United States.

A recent projection of the supply of physicians for the United States counts on 200 new licentiates annually from Canadian medical schools.[1] In 1962/63, 67 American students were enrolled in Canadian medical schools, 60 of whom would be expected to graduate in 1966 and return to the United States. This would indicate reliance on the registration of 140 Canadian physicians that year; a total loss to the United States of about one-fifth of the estimated output of the 12 Canadian schools.

In order to ascertain the trends in recent years we must turn to a slightly different kind of count. Up to this point we have considered graduates of Canadian medical schools who had become licensed to practise medicine in the United States, classified according to birthplace. The following chronological comparisons deal with Canadian citizens, irrespective of birthplace who have entered the United States "for educational purposes and intend to return home upon completion of their assignment".[2] Two groups in this category may be followed through the seven-year period 1955–56 to 1961–62. For the most part they represent persons taking posts for training or advanced esperience in hospitals and medical faculties.

In Table 12–8 it is seen that between 44 and 75 Canadians each year have taken their internship in American hospitals. This is normally a one-year appointment. On the other hand, nearly ten times as many have held appointments as hospital residents, the maximum being 659 in 1961/62, all ostensibly to return. How many of these are in their first, second, third, or fourth year of residency training is not known. But this count does not include Canadians who have immigrated formally to the United States. The census taken by the A.M.A. in the same year shows graduates of Canadian medical schools in 138 internships and 1,049 residencies. Their classification by country of birth is seen in Table 12–9. If one deducts the American-born physicians, (61 interns and 227 residents or fellows,) then it is possible that in 1961–62 there were as many as 77 Canadian medical graduates in internships and 822 in hospital residencies or fellowship posts who were or had been Canadian citizens or residents. Until the size of the return flow is known, as well as the character of the experience gained, one cannot tell what possible benefits may offset so obvious a loss.

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[1] Peterson, P.Q, and Pennall, M.Y, "Physician Population Projections, 1961–1975: Their Causes and Implications." *American Journal of Public Health*, 53:163–172, February 1963. The median age of the new Canadian licentiates is 32 years, about six years older than the average graduate of a United States school.

[2] Data derived from *Open Doors, Report on International Exchange*, published annually since 1956 by The Institute of International Education, 800 Second Avenue, New York 17. Whether this enumeration includes also some foreign-born Canadian residents who have not yet completed the requirements for Canadian citizenship, as well as physicians who have entered the United States as students or visitors but expect to remain indefinitely, cannot be ascertained.

TABLE 12-8

PHYSICIANS FROM CANADA TRAINING IN UNITED STATES HOSPITALS
1955–56 to 1961–62[1]

Year	Interns	Residents	Total
1955–56	44	540	584
1956–57	60	516	576
1957–58	66	469	535
1958–59	50	513	563
1959–60	52	487	539
1960–61	75	583	658
1961–62	67	659	726

[1] Reported as of "Canadian nationality". Immigrants *not* counted.

Source: *Open Doors, Reports on International Exchange*, Institute of International Education, New York.
Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, Table 2—17.

TABLE 12-9

GRADUATES OF CANADIAN MEDICAL SCHOOLS IN TRAINING POSTS IN HOSPITALS OF THE UNITED STATES
1961–62, BY COUNTRY OF BIRTH

Appointment	Number by country of birth				
	Canada	U.S.A.	Other countries	Not reported	Total
Intern	53	61	22	2	138
Resident or Fellow	543	227	75	204	1,049

Source: American Medical Association.
Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, Table 2—16, adapted.

TABLE 12-10

PHYSICIANS FROM CANADA IN FULL-TIME MEDICAL FACULTY APPOINTMENTS IN THE UNITED STATES, BY YEARS, 1955–56 to 1961–62[1]

Year	Number
1955–56	12
1956–57	15
1957–58	20
1958–59	34
1959–60	33
1960–61	69
1961–62	72

[1] Reported as of "Canadian nationality". Immigrants not counted. Based on questionnaire to colleges and universities; response, 69 per cent. Not all of these are necessarily medical graduates.

Source: *Open Doors, Report on International Exchange*, Institute of International Education, New York. Judek, S., *Medical Manpower in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964.

CANADIAN GRADUATES ON MEDICAL FACULTIES IN UNITED STATES

Even more striking than the increasing number of Canadian physicians in hospital training posts is the record of appointments to the medical faculties of the United States. Table 12–10 shows an increase from 12 in 1955/56 to 72 in 1961/62. Again, this excludes from the count any Canadians who have migrated formally to the United States or who have indicated to the university their intention to remain. In this connection, the A.M.A. census of Canadian-trained, licensed physicians in full-time university appointments, after subtracting 29 who came originally from the United States, revealed 90 Canadian born, 11 born in other countries and one without birthplace reported. In other words, here is a loss in teaching potential equivalent to one year's output of two of the smaller Canadian medical schools. In fact, it is even greater than this, on two scores. The same A.M.A. census lists an additional 65 Canadian-trained physicians engaged in research (41 born in Canada, 17 in the United States, 6 in other countries and 1 not noted). Besides medical graduates there is also the group of medical scientists who have come up the Master's-Ph.D. ladder who had either all or part of their education in Canada and are now teaching or engaged in research in American institutions. Their number is unknown. Finally, there are the Canadians in all categories, also uncounted, who are studying, teaching or working in Britain, France and elsewhere.

While it is complimentary to Canadians and to Canadian medical education to have such substantial representation on the faculties of the American universities and on the staffs of their hospitals, it is important to know whether some of this flow of talent could be diverted to meeting our own needs. It is also important to know whether Canadian institutions could bid successfully for a larger representation of American scholarship.[1] The cause of the latter imbalance has not been studied. In addition to salary differences there is the relatively greater difficulty of obtaining registration in some of the provinces and Canadian certification in the specialties. There may be also the tendency for Canadian universities to seek candidates first from Canada, then from Britain or the continent.

Reflection on these figures leads one naturally to ask the following questions: Are Canadian medical schools producing proportionately too many graduates with academic ambitions? Have Canadian medical faculties had a sufficient number of full-time and suitable part-time teaching appointments to accommodate the scientifically oriented or academically interested graduates? Are there qualitative differences between the Canadians who teach in Canada and those who teach in the United States? We would answer all of these in the negative. Much has been made of higher salaries in the U.S., but are there other significant differences between Canadian and American teaching appointments such as in research facilities, departmental or faculty atmosphere, staff support and travel arrangements? Each of these possibilities would have to be examined if this flow of talent out of the country were to be diverted to Canadian development. As in the case of so many other issues raised in this study on medical education, there is the need to muster more precise information before key questions can

[1] Four teachers with American citizenship are reported to have gone from medical faculties in the United States to Canadian universities in 1961/62. They are not necessarily physicians. *Open Doors, ibid*, 1962.

be answered and appropriate policy be determined. Even though a great expansion of the number of teaching and research posts must lie ahead it would seem essential, as already urged, to encourage the Canadian Universities Foundation and its associate committee, the Association of Canadian Medical Colleges, to develop studies in depth on the factors that determine the migration of university graduates and particularly of faculty. This research should be dovetailed with the statistical activities of several departments of the Federal Government to yield a comprehensive picture of Canada's academic manpower resources. To be added, therefore, to the six emergency measures listed on pages 252 to 253 is the project: *Study of the Staffing of Canadian Medical Faculties.*

An eighth measure raised for early consideration concerns the internship. To what extent does taking this appointment in an American hospital predispose a Canadian to get his residency training in the United States and subsequently settle to in that country? Many instances of this sequence are known but the actual influence of the choice of an American internship by a Canadian graduate who is also a Canadian citizen or resident has not been studied. The natural desire of many Canadians to see the wider world is appreciated. The distinctive attributes of many American medical centres also must be recognized. Nevertheless there is increasing variety on the Canadian scene and with the growing tendency to take more than one year of hospital training there is further opportunity to sample another setting before settling down. Moreover, there is the fact that a number of Canada's teaching hospitals have been unable to recruit sufficient house staff to maintain the standards expected of them. It is realized, on the other hand, that a degree of competition between hospitals to win the favour of the medical students is wholesome. Weighing all of these considerations the following hypothesis is advanced:

> *If the Canadian universities with medical faculties, the provincial medical boards and the Medical Council of Canada were to agree to require the preregistration internship of Canadian resident students and graduates to be carried out in Canadian hospitals, then the loss of physicians permanently to the United States would be reduced.*

SUMMARY

If Canada's intake of medical students in the next quarter century is to be doubled then it is essential that the expansion of existing institutions and the creation of new medical schools and teaching hospitals take place in an orderly manner, based on sound principles and related to the needs and resources of society. The objectives of the modern university medical or health sciences centre are now clearly evident as are also the conditions that must obtain if they are to be achieved.

Foremost among the requisites of a new medical school is the relationship to the university. The latter's academic strength, financial resources and sense of mission to the community are vital. The venture should have the support of the medical and allied health professions as well as the moral and financial backing of government at all levels. Without assurance of the last of these no university will embark on what is inevitably a costly, time-consuming and tension-producing undertaking.

Canadian planners of new facilities should take advantage of the well documented experience of recently founded university medical centres in the United States. They should be sensitive to significant trends in medical centre planning in Britain, France and elsewhere. Especially important is the preliminary survey sponsored by a broadly representative advisory group, to ascertain the region's requirements, the resources available and the implications of every aspect of the enterprise. All should realize that it takes from eight to ten years to plan and build a medical school with its hospital and other clinical facilities, to recruit staff and to graduate its first undergraduate class. A schedule for the various stages is suggested as a guide. The precise location of new schools will depend upon a cluster of factors, some of which are best assessed by survey and consultation of the type recommended.

A plea is made that at least two schools teaching in English and in French respectively should be clearly experimental in their organization and their curricular arrangements. For example, the next school in the Atlantic region, either English- or French-speaking, might well direct its imagination and effort towards a special assessment of rural community needs, and an inventive approach to them. The two-year school, or combination of arts-science experience with the preclinical years of medicine, may be a useful vehicle for curricular experimentation as well as a means of increasing enrolment in medical studies. The final two clinical years and internship would be completed in a larger centre.

If the supply of trained personnel is to meet requirements then enlarged resources should be provided to construct additional facilities, to meet greater operating costs, to reorganize special services, e.g., medical science libraries, and to increase the supply of teachers. The improvement and expansion of existing institutions will be as urgent as the creation of new units. Special financial support will be required as follows:

1. *Construction costs* for better educational facilities in existing medical schools and major teaching hospitals, including l'Université de Sherbrooke, will be of the order of $300 million, of which one-third will be for research. Completely new university health sciences centres to be constructed in the later '60's and early '70's, of which four are recommended, are likely to cost between $25 million and $30 million each. (The extent to which one or more two-year schools should play a part requires further study.)

2. *Operating budgets* of most of Canada's 12 medical schools are badly below the levels required to meet modern requirements in research, graduate training, continuing education of the practitioners and experimentation with new methods of undergraduate instruction. The shortage is particularly noticeable in the budgets for personnel. (Seven smaller schools with an average intake of 65 students in 1961–62 had an average budget of $882,000. This is 47 per cent of the American "middle of the road" estimate for an institution of the same size. Our four schools with an average first year class size of 128 in 1961/62 had an average budget of $1.5 million. This is 65 per cent of that proposed as a reasonable budget for somewhat smaller schools (96 entering students).) As a group, Canada's existing medical schools require a very substantial increase in operating budgets especially for personnel. New schools of the size proposed should count on a basic budget eventually of $1.5

million. The larger schools will require from $2 to $2.5 million. A two-year school's operations may cost from $500,000 to $700,000.

It should be remembered that medical students will account for only about one-half of the teaching obligation of the faculty. In 1961/62, in the eight smaller Canadian medical schools, the medical undergraduates comprised only 22 per cent of all receiving instruction from the medical faculty. In terms of "equivalent full-time students" the medical undergraduates were 52 per cent of the total.

3. *Medical science libraries* need expansion in virtually every category to meet the growing requirements of research, graduate studies and new trends in teaching. A nation-wide co-ordinated network of co-operative regional centres has been proposed to give Canadian teachers and research workers an effective bibliographic service in keeping with the resources of the country.[1] This would call for a capital outlay of $6 million to establish central and regional bibliographic facilities, remedial grants to existing libraries, libraries for new medical schools and teaching hospitals, etc. Some of this would be covered in other allocations. An annual recurring expense of about $600,000 was proposed; most of it for grants to provide library support in the medical colleges in proportion to the research being done.

4. *New faculty* in sufficient numbers will pose the greatest problem. The projected requirement for the seven years 1964–71, calls for 770 new full-time teachers (an increase of 93 per cent over 1961/62), 280 in the basic medical sciences and 490 in the clinical fields (increases of 64 and 126 per cent respectively). The latter estimate assumes that we will continue to rely on a substantial amount of teaching being done by part-time, practising physicians. Existing schools need an increase in basic science faculty by one-quarter; in full-time clinical faculty by over three-quarters. Turning to specific subjects in which recruitment has been most difficult, one finds the need to provide for 50 new posts in the various branches of anatomy, 40 in microbiology and 45 in pharmacology. (In 1961/62, 40 per cent of our medical science teachers were trained outside of Canada; 55 per cent of the total group were Canadians. An increasing proportion possess Ph.D. degrees; over one-half in physiology and pharmacology, and nearly that many in anatomy and microbiology. Thus, the supply of faculty in the medical science departments is critically dependent upon teachers trained outside Canada and increasingly so upon the output of graduates with higher degrees in the medical sciences.)

Comparison of the output of Ph.D. medical scientists with the projected requirement reveals a grave shortage in virtually every field. This deficit must be considered in the light of a stationary level of production of Ph.D.'s in the biological sciences relevant to medicine. (In the seven years beginning 1956/57, the average number of doctorates awarded annually was 35 (range 30–47). The number of Master's degrees awarded in these sciences, using weighted averages, increased by less than four per cent per year (average 58; range 53–70). From this pool must come not only university teachers in the various biological sciences but also research workers for industry and government laboratories. Allowance should be made too for emigration, deaths and drop-out among those recently graduated due to other causes.

[1] Simon, Beatrice V., *Library Support for Medical Education and Research in Canada*, *op. cit.*

The supply of competent basic scientists from graduates in medicine, without higher university degrees, has not been studied. The only evidence available is the declining ratio of M.D. to Ph.D. teachers in these departments. This implies a dwindling supply of teachers from this source also.

An immediate, seven-point "crash programme", on an emergency basis, is urged to increase the supply of teachers essential to the desired expansion of educational facilities for the health professions. This programme includes a number of remedial measures already discussed in these chapters:

1. Construction of medical research facilities in universities and teaching hospitals.
2. Increase in the number and value of research fellowships and associateships in the bio-medical sciences.
3. Increased grants-in-aid for the support of research in these fields.
4. Increase in the number and value of undergraduate scholarships, bursaries and loan funds to facilitate scientific pursuits in vocations.
5. Special efforts by the universities to encourage stimulating teaching and active research on the more dynamic themes in the biological sciences.
6. Modification of the medical undergraduate curriculum to permit able students to pursue elective study in greater depth in subject of special interest to them.

The seventh measure is to undertake at the same time a broad-gauge study of the staffing of Canadian medical faculties. One of its major tasks would be to examine the cause and extent of the loss of talent to the United States and to suggest how best to reduce it. (Canadian-born graduates of Canadian universities, licensed to practise in the United States, were reported in 1962 to occupy 90 full-time posts in medical faculties, 53 internships, 543 hospital residencies and 41 research positions, all in American institutions. Moreover, the count of Canadian citizens with full-time appointments to American medical faculties who have entered the United States "for educational purposes and intend to return home upon completion of their assignment" increased from 12 in 1955/56 to 72 in 1961/62.)

It is common knowledge that some physicians in this category are eager to return to Canada but are unable to find suitable appointments. There is no knowledge of the number who have this experience nor of those who fail to return. The proposed expansion of teaching and research facilities in Canada no doubt would attract and accommodate many who have sought training elsewhere.

A further step to reduce the loss of physicians is presented for consideration by the provincial medical boards, the universities with medical schools and the Medical Council of Canada. This is to require Canadian medical graduates other than non-residents to take their pre-registration internship in Canadian hospitals.

CHAPTER 13

PARAMEDICAL MANPOWER IN CANADA

Throughout this report there have been frequent references to the increasing complexity in the practice of modern medicine. New methods of diagnosis and new therapeutic procedures frequently involve the use of complicated and delicate machines as well as highly technical problems in the fields of physiology, physics and biochemistry. Examples of such procedures are the use of the artificial kidney in acute renal failure, the modern approach to the diagnosis of cardiac lesions, cinemaradiography of lesions of the gastro-intestinal tract, and advanced electroencephalography arteriography and electromyography. The use of radio-isotopes is an every day requirement of the routine laboratory service of every large teaching hospital. The operating room requirements for modern cardiac surgery and brain surgery include multi-channel recording apparatus, by which the anaesthetics can keep careful check on all the systems of the body – heart-lung exchange systems, cooling machines, and various other pieces of highly technical apparatus. Obviously the surgeon, although he has some knowledge of all this formidable array of machines, must be free of all responsibility for their smooth operation, once he sets about such a task as doing open heart surgery or controlling the leak of blood from an aneurysm in the circulation to the brain.

In everyday practice the physician leans heavily on men and women who carry out pathological, haematological, biochemical and physical tests in the laboratories, who are responsible for taking X-ray films, who guide the convalescent in the restoration of physical function, and who check and file the records of patients. Others work with the doctor in assessing, and where possible correcting, social and environmental factors, or in measuring psychological factors in illness. The physician of the future will need to recognize and work with an ever-increasing number of paramedical and related professional personnel if he is to utilize his own special training and education to the best advantage of his patients and the community.

We see an increasing trend to group practice; we see the hospital developing towards a community health centre. In both these developments there will be more opportunity for an organized team approach to nearly every problem in medicine.

In Appendix 1 there has been prepared in some detail factual data on some 20-odd groups of people with whom the doctor now works very closely. As set out in the criteria which apply to such a group, none of them will practice indepently.[1] They work as part of the health team. In many of the groups the present facilities for training are inadequate. In others the financial rewards, as related to the investment of time and effort in acquiring the necessary qualifications, are insufficient to attract enough candidates. Many of those who train are young girls whose active life in their new vocation is sharply limited in duration by marriage — although in many instances, as in nursing, it is hoped that they will return to active work in the health team later in life, even if it is on a part-time basis.

Doctors should take an active interest in the education and welfare of the particular groups with which they have such a close association. This relationship is well exemplified in the way in which the radiologists have helped the radiological technicians to organize their national association, to direct courses of training in all the large general hospitals, to assist in lectures and examinations, and finally, to help ensure, through training grants or hospital insurance, that students in training will receive some remuneration during the training period. In our survey of schools during 1961–62, we found no shortage of candidates for training as radiographers, nor did we hear of any notable shortage of trained personnel in the establishments of the departments of radiology in the larger hospitals.

With the present tremendous pressures on the universities, there is naturally some resistance to taking responsibility for training increasing numbers of students in areas which are largely technical. It has been suggested that at least some of the groups should be trained at technical schools; and yet most of the groups to have some knowledge of basic sciences which are taught only in medical schools. If they cannot be accommodated in the increasingly overcrowded departments of anatomy, biochemistry, physiology and pathology, they must at least have instruction by those who are qualified and prepared to teach the basic sciences at the required level. (The qualified radiologist can and does teach anatomy to the student radiographer.)

Nearly all the groups will need association with patients. Their life work is to be in the health field and they must see the team in action. They must very early in their training learn to talk to patients and appreciate what illness and disability mean.

We believe that medical schools, perhaps as part of an organized health sciences centre, should be prepared to play a very large part in the training of increased numbers of paramedical personnel and associated professions. It is true that in some instances the entire training may be carried out in hospitals. (Radiographers and laboratory technologists are now trained in certain hospitals other

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[1] In Appendix 2, there is a discussion of one independent group — — the optometrists — — who work in the health sciences field. Certain recommendations are made, which will be included in our conclusions at the termination of this chapter.

than those affiliated with medical schools.) But it is to the Health Sciences Centres that the country will look for leadership in the training of new groups.

In another section of this report reference is made to the organization of a Health Sciences Centre, and the manner in which training of paramedical personnel at less than degree level might be carried out. Methods will vary in different centres, but we would urge specialists and teachers in medical schools, as well as the members of the organized professions, to make every effort to encourage the training of increasing numbers of young men and women in the ranks of paramedical and related professions.

Arrangements for financial support for facilities in teaching and training will vary from province to province, and in the different universities and medical schools. It is therefore difficult to make specific recommendations. The members of the group are convinced, however, that the enlistment in sufficient numbers, the education and training, and suitable remuneration for all the groups of paramedical and related professions are of the utmost importance in the planning of the future health service for Canada.

CONCLUSIONS

1. As many as possible of the members of the paramedical and related professions should be educated and trained in conjunction with other members of the health team. A grouping of teaching and exemplary service in the Health Sciences Centre would facilitate such an objective.
2. Some uniformity of subsidization or financial support of paramedical workers is desirable.
3. Teachers in the medical schools should be associated with the paramedical groups on the various national committees which control standards of teaching and final examinations.
4. There should be established as soon as possible training schools for refractionists. This implies the concurrence and active interest of the Canadian Association of Ophthalmologists and particularly such members as are engaged in active teaching in medical schools and Health Sciences Centres.

CHAPTER 14

PUBLIC HEALTH AND PREVENTIVE MEDICINE

Throughout the discussion on curriculum there has not been any attempt to deal with any particular teaching department. Those who have responsibility for this study have, however, been concerned with the place of preventive medicine and public health in the undergraduate course, and as a special area of post-graduate teaching and investigation.

No member of the study group has had experience in this field. Dean Stewart of Dalhousie Medical School, who has had extensive graduate experience as well as teaching responsibilities in this area, was asked to visit the two Canadian schools of Public Health and to make a special report on the Canadian situation relating to preventive medicine and public health. This report is available as Appendix 3.

With the tremendous advances which were made in preventing disease in the latter part of the 19th and the early years of the present century, most schools made arrangements for their undergraduates to learn something of this new approach to medicine. Typhoid fever disappeared from the teaching wards because doctors had shown municipal governments that proper control of water supplies would eradicate the disease. Likewise diphtheria and smallpox are never seen because doctors have discovered means of inoculation and vaccination. Preventive medicine, as a discipline, grew out of increasing knowledge of microbial disease, and the social and community measures which might be taken by governments and local authorities to control the spread of infection – whether by public sanitation, by improved housing, the pasteurization of milk, or the use of an ever-increasing number of inoculations or vaccinations.

During these tremendously important phases of preventive medicine, those who worked and taught in the new discipline tended to become isolated from the ranks of curative medicine, while the majority of the physicians and an ever-increasing number of clinical specialists, in their turn, had little interest in preventive medicine. Those who worked with children and those who specialized in obstetrics, however, recognized the value of prevention, and as a result ante-natal clinics and well-baby clinics became important features of all large centres,

and the principles involved became part of the undergraduate teaching in these specialties.

In the meantime, departments of preventive medicine in two large faculties of medicine developed into schools of public health, reflecting the increasing pressure by governments to seek centres where doctors could receive special training in the administration of preventive programmes in cities, counties and districts.

The various measures of prevention for which the doctors in the public health movement were responsible have now become accepted in every community in the civilized world. Doctors supervise public health units in which sanitary engineers, food supervisors and public health nurses carry much of the responsibility for detail. The conquest of infectious disease has been largely accomplished. It is only natural that the younger group of men who have chosen this particular area as a specialty should seek new fields and a closer association with doctors in the clinical fields. They seek to employ and expand their knowledge of biometrics and epidemiology in other areas.

John Ryle of Guy's Hospital, London, after a successful career as a consulting physician, went to Oxford in 1945 as the first Professor of Social Medicine. Brotherston of Edinburgh reflected his ideas of community and social medicine, in taking over a segment of the Edinburgh population and providing, within the university department, a general medical service where he taught his students the approach to a high quality of medical care, under the National Health Insurance Plan. Other schools developed, under their programmes of community and social medicine, special interests in social psychiatry, rehabilitation, and geriatric care.

The schools of public health, both in the United States and Canada, began to interest themselves in administrative medicine, and courses for hospital administration are now carried on almost exclusively under their guidance. These schools have also been examining various plans of medical care insurance and hospital insurance. Such plans are usually evolved by or with the active co-operation of governments, whose medical personnel have usually had post-graduate training in public health. It is therefore a perfectly logical step for the schools to offer to provide training for the ever-increasing number of men and women who will be needed for administrative medicine.

There is a danger in such a trend that, as in the United Kingdom, the doctors in the public health and administrative services may be further isolated from the rank and file of those who practise. It is interesting to note that in the "Recent Review of the Medical Services in Great Britain"[1] – a book which describes the finding of a special committee under the chairmanship of Sir Arthur Porritt – it is recommended that the three divisions of medical effort hospital, general practice, and public health be combined under an area health board which shall have the responsibility of administering and integrating all the services in a given area.

[1] Review of the Medical Services in Great Britain 1963. Social Assays, 56 Kingsway, London, W. C. 3.

That the teachers and workers in Schools of Public Health are giving careful consideration to the future organization of health services in a comprehensive scale is exemplified by the very excellent and carefully documented brief to the Royal Ccmmission presented by Dr. A. J. Rhodes, Director of the School of Hygiene in the University of Toronto. The brief recommends a comprehensive health service for Canada which would include special divisions such as Hospital Services, Public Health Services, Personal Health Services and Voluntary Agencies – all these divisions to be co-ordinated under a Ministry of Health by a Provincial Advisory Health Council which would comprise representatives of government, the various health professions, voluntary health agencies, the universities and the general public. Similarly constituted councils might function at area or district levels in the provinces, and at national levels with the co-operation of the Federal Government.

Dr. Rhodes makes a very strong plea for the strengthening of the existing Schools of Public Health in Canada. He sees them as staff colleges, with the obligations and objectives of supplying the personnel for steadily increasing needs of the nation in the public health field. It seems to us that he is amply justified in asking for special financial support for the universities which have borne the major burden of education in this field for 35 years.

It is not easy to foresee what sort of administrative pattern may emerge if governments sponsor comprehensive medical care programmes in Canada.

The members of the group see some danger in the present trend for public health organizations and schools to assume that traditional training in that discipline fits them for the increasing responsibilities of administration. It is obvious that administrators should be made aware of the problems of practice at all levels, and if Schools of Public Health are to be the main training area of medical administrators, those in charge of curricula should seek more active co-operation with the clinical specialties. They should include a year or more of clinical experience in the training programme of the future public health officer and medical administrator.

We have given some thought to the need for expanding the facilities for training of public health and administrative personnel. Some members of our group believe that the departments of preventive medicine in Canadian medical schools would be strengthened if they could develop programmes in the post-graduate field where, with active co-operation with the clinical and basic science departments, they might develop courses for the public health officer, the public health nurse and the medical administrator. Such a development would bring public health more in line with various other specialties and make for better understanding between doctors in practice and doctors in administration. Dean Stewart does not agree with this concept. He believes that the basic sciences of public health, e.g. biostatistics and epidemiology, are not available in most Canadian medical schools, and can be developed only at the level necessary for graduate teaching in schools of public health.

We see no need at the present time for considering the establishment of a third School of Public Health. Many of the candidates for diploma courses come from outside Canada, and yet the two schools as presently constituted are apparently able to meet the demands of all the applicants from the provinces who seek training. Indeed we believe that with the necessary financial support for operations and facilities, their capacity for student intake in the fields of public health, occupational health, hospital administration and public health administration might be increased by 50 per cent.

The teaching of preventive medicine at the undergraduate level varies tremendously in content, form and the time allotted to it in Canadian, British and American schools. In Britain there is no final examination in this subject. It is, of course, a subject of the qualifying examinations of the Medical Council of Canada. The stress in some university departments is on the control of infectious disease, and organization of a public health effort in a community. In others, there is more stress on acquainting the student with family care under the guidance of selected family doctors. The wide variation in the names given to the departments reflects the varying philosophies: "Preventive Medicine", "Social Medicine", "Community Medicine", "Public Health and Hygiene". Although the principles of preventive and social medicine are taught in departments of paediatrics, medicine, psychiatry and obstetrics, there will remain a place for a department which takes a special interest in correlating teaching and encouraging investigation in social and community medicine. The undergraduate should not be burdened with all the details and techniques of community health legislation and the means of enforcing it. That there is a gradual departure from such a practice is evidenced by the changes in the types of question that are asked the student on the final examinations of the Medical Council of Canada. This subject might be removed ultimately from the Council lists, and questions on preventive medicine asked on the papers in the clinical subjects.

It is realized that the discussion of this subject has so far left several questions unanswered. The first one is the organization and future place of the teaching of preventive medicine in the undergraduate curriculum, and how the importance of the preventive principle may be impressed on practising doctors everywhere. An expert committee of the World Health Organization examined these questions in August of 1963; the report of its recommendations will be available in the Technical Report series later in the year[1]. One of us was a member of an advisory panel on professional and technical education of medical and auxilliary personnel and was invited to sit in with the expert committee in its deliberations. It is interesting to note the main points which were stressed and the recommendations that will be forthcoming. In general they are as follows:
(1) That the responsibility for stressing the importance of prevention in undergraduate teaching should rest for the most part with the clinical departments, notably medicine, paediatrics, psychiatry, obstetrics, ophthalmology and surgery.
(2) That there should be a department of preventive medicine – social medicine or community medicine – the name will vary in different communities – which

[1] Now available as World Health Organization Technical Report, Series No. 269, Geneva, 1964.

should co-ordinate the teaching and engage in research. (3) The head of such a department should have a background of clinical training and practice. He need not necessarily have any formal degree or qualification in public health but should have experience in epidemiology, biostatistics and sociology. (4) The department should co-operate with the school's division of postgraduate education and take every opportunity of teaching groups of practising doctors the various facets of preventive and community medicine. Although it will probably not appear as a recommendation of the World Health Organization Expert Committee, we feel that if a school chooses a man with a background of clinical training and practice to head a department of preventive medicine, he and the other members of his staff who have similar backgrounds should have actual appointments with either in- or out-patients, in one of the teaching hospitals affiliated with the school.

The next obvious question is in relation to the training and future place of the public health officer in the community. Here is one specialist who by his tremendous efforts in studies of prevention in the early part of the century, surely has eliminated the need of much of the work in which he was formerly engaged. This may be true only in the developed countries, for in the underdeveloped nations the work of the public health officer is not unlike the task of his predecessor of fifty years ago in North America.

The public health officer now has experts in sanitation and in public health nursing at his service, and his work is largely supervisory and administrative. He has responsibilities in meeting the problems of his community relating to infectious disease, the health of school children and rehabilitation.

How then should he be trained? Does his future advancement depend on research in epidemiology, on the control of infectious disease, or on increasing administrative capability and responsibility? Who should occupy the increasing number of medical administrative posts which will inevitably result from the establishment of hospital and medical care insurance programmes? In an effort to clarify our thinking on these questions we have had discussions with some of the members of the staff of the schools of public health in Canada and we have had an opportunity to see the staff college for hospital administrators in London, England, where many of the non-medical administrators are trained for senior posts in the British Health Services.

The need for a change in the rather rigid curriculum of the "Diploma of Public Health" at the University of Toronto has been apparent to members of the staff there for some years and the final recommendations of a committee which has been working on the problem will be shortly available. It is realized that Canada may expect to be asked for several years to train personnel in public health from underdeveloped countries. Indeed more than half the present class are non-Canadians. On the other hand very few Canadian doctors are enrolling in Public Health courses. In the 10 years during which the Faculty of Medicine at the University of British Columbia has been qualifying doctors, not one Canadian graduate of that school selected public health as a specialty. Many of the vacancies in public health

posts in Canada have been filled by medical men from the United Kingdom during the last 15 years. Obviously Schools of Public Health in Canada must be aware of these facts, but their task is not a simple one. While a more or less classical type of curriculum must be offered to the doctors from the underdeveloped area, studies qualifying the doctor for quite different duties and responsibilities in Canada should be offered to our own graduates, and these new programmes should be organized with some imagination and realization of the rapidly changing role of the public health officer in a community. From Professor leRiche of the School of Hygiene at the University of Toronto we learned that there is an awareness of the need for change in the curriculum and methods of training for medical officers of health who are likely to take posts in Canada. It is expected that a new outline of courses will shortly be approved so that the necessary changes of programme will be effected in the autumn of 1964.

If the Schools of Public Health in Canada are to be regarded as the staff colleges for the health services of the community, and if they are to receive federal and provincial government support on that basis, there are several criteria which should be met:

(1) Medical officers of health must be prepared for a very different series of tasks than was the case 25 years ago. The courses in both schools have put heavy emphasis on lecture courses and laboratory work in microbiology. Surely this is no longer necessary. Although the future public health officer will continue to have responsibility for infectious desease control, he will have adequate technical and laboratory assistance. His necessary interest in many other facets of community health will require that he have clinical knowledge and active clinical contacts.

(2) There should be an opportunity for some electives in the course, particularly for those who expect to take up posts which necessitate more administrative work, or research and investigation.

(3) There should be provision for the training of some relatively senior clinicians who have been selected to fill important administrative posts in the health services. Such courses should not necessarily qualify for a degree or diploma.

Dr. leRiche has indicated that the School in Toronto will probably seek to fill some of the needs for special requirements by asking the candidates to register in the Graduate School in the University and take certain special courses qualifying them for a master's degree. We are not convinced that the confining and rigorous regulations of graduate schools are required to effect what we see as urgently necessary – the qualification of doctors as health officers in the new world of community health, and the special training in health administration of a small number of experienced clinicians who will be asked to assume senior administrative responsibilities.

It is recognized of course that aside from the training of Canadian public health officers and administrators, the schools have many other responsibilities. It is surprising how many of the faculties and division in the large universities seek courses in public health and in health education when they are available

through their schools of hygiene. We see increasing opportunities for the schools to engage in tasks of research and evaluation in the particular fields of biometrics, epidemiology and types of medical care programmes.

Perhaps it is in this area that intensive studies, arranged to conform to graduate school requirements, will be of the greatest value. Given the awareness on the part of the schools of the various changes that are necessary they should seek forthwith to recruit as staff members men and women of imagination, capability, and a background of training in those particular fields which will equip them to recognize the problems which may emerge from a gradual reorganization of the Health Services of Canada — and to approach with enthusiasm the teaching of others, and the investigation of new problems as they arise.

CONCLUSIONS

(1) That the two Schools of Public Health in Canada receive through their respective universities an annual federal grant amounting to 25 per cent of the operating budget of the school.

(2) That the schools share in the federal grants for new buildings and rehabilitation of old buildings as recommended in Chapter 7.

(3) That in each medical school there should be a department known as preventive medicine, community medicine or social medicine. A suitably qualified head should co-ordinate the teaching of preventive medicine in the school but much of the responsibility should devolve on the various clinical departments. It will be useful if the head of the department of preventive medicine has a background of clinical training and practice, and it is recommended that he continue to maintain active contact in the particular clinical field in which he has had experience.

(4) That schools of public health give early consideration to a revision of their courses of training — particularly the programme for the Diploma in Public Health. There should be a decreasing stress on microbiology and an increasing effort to stress the organization of clinical management of special groups such as the aged, the chronically ill and the disabled. This can only be achieved by close association with the various clinical departments of the medical school.

(5) The schools of public health if they are to be recognized as the staff colleges for the national health services should give careful consideration to the provision of adequate courses for medical administrators. In some instances this may be achieved by providing electives in a revised Diploma in Public Health course, in others by offering a second year of concentration in appropriate fields, and in others by specially tailored courses for more mature men who have a background of successful clinical practice.

CHAPTER 15

PROVISION AND MAINTENANCE OF "THE BEST POSSIBLE HEALTH CARE"

Canadians are accustomed to hearing such expressions as "the highest standards of medical care", "the best possible medical care" and, in recent years, "the quality of medical care". The Committee of the Privy Council which recommended the appointment of a Royal Commission on Health Services, stated that "it is considered to be in the public interest to have a comprehensive and independent study made of the needs of the Canadian people for health services, and the resources available to meet such needs with a view to recommending methods of ensuring that the best possible health care is available to all Canadians".[1] What evidence have we concerning the quality of medical care available to Canadians to-day?

Improvement in the quality of medical care is reflected in the increasing life expectancy at birth which has occurred in Canada. In 1900 the average life expectancy was 47 years; it rose to about 60 years in 1930 and during the past quarter-century it has risen further to about 70 years. Nevertheless, life expectancy in the Scandinavian countries is higher than in Canada; in 1959 the life expectancy of a white male in Canada was 66.6, Denmark 69.9, Sweden 70.5 and Norway 71.1 years respectively. The life expectancy at birth in Australia, New Zealand and the United Kingdom also just exceeds that in Canada.

Improvement in life expectancy is not a completely valid measure of the quality of medical care; this improvement has been largely as a result of a sharp decline in the death rate in the younger age groups. There has been almost no improvement in life expectancy in the older age groups; of the 23 years gained in life expectancy since 1900, only four and one half years have been added to those who have reached age 45 and only two years to those who have reached 65. But, as it affects the total population, it reflects the phenomenal decline in death rate from such diseases as tuberculosis, pneumonia and influenza as well as from the communicable diseases which have been strikingly affected by public health practices. It is of interest to note that in 1920 there were 14,000 cases of diphtheria and 3,600 cases of typhoid fever in Canada. In 1960 the numbers were 53 and 335, respectively.

[1] Order in Council 1961—883, dated 20th June, 1961.

Another index of the quality of medical care is the infant mortality rate, the numbers of infants who die in the first year of life of every 1,000 born alive. The infant mortality rate for a number of countries is presented in Table 15–1.

TABLE 15-1

INFANT MORTALITY[1]

Country	Rate[2]	Rank
Sweden	16	1
Netherlands	17	2
Norway	19	3
Australia	20	4
Finland	20	4
New Zealand	20	4
Switzerland	21	5
Denmark	22	6
England and Wales	22	6
Scotland	26	7
United States	26	7
Canada	27	8
Northern Ireland	27	8

[1] 1960 or latest year available.

[2] Per 1,000 live births.

Source: Dominion Bureau of Statistics, Vital Statistics, 1960, Ottawa: Queen's Printer.

Canada's infant mortality rate in 1960 was eighth in rank, being higher than that of 11 other countries of similar or lower economic status.

These two crude indices should prevent Canadians from being complacent. Though we enjoy the second highest standard of living in the world, we have not yet reached the parallel level of medical care.

In recent years attempts have been made to employ new methods of assessing the adequacy of medical care. The patient in hospital has been particularly susceptible to study and the Canadian Medical Association, Canadian Hospital Association and the Royal College of Physicians and Surgeons of Canada have combined to establish the Canadian Council of Hospital Accreditation for the purpose of examining the effectiveness of hospital operation. The Council has applied techniques which measure the quality of care in hospital, and it issues certificates of accreditation to hospitals which reach a satisfactory standard. Their method of examination permits the hospital board, the physicians, and the public to compare the care provided in their hospital with that in others.

Ancillary to the accreditation procedures, medical staffs of hospitals attempt to evaluate the quality of medical care which they provide, by the appointment of such committees as:

Tissue Committees – which study the tissues removed by surgeons and quickly expose the surgeon who frequently removed normal tissues.

Medical Audit Committees – which review medical records, pre- and post-operative diagnoses and other measures, and provide a standard method of evaluation of the medical care provided by physicians.

Medical Records Committees – which study the quality of the physician's records of his patient and establish an acceptable standard.

The Professional Activities Survey – a recent approach to an evaluation of certain aspects of medical records, leading to a more sophisticated appraisal of the quality of care provided in hospital.

All of these devices have tended to measure the care of the patient after he has left hospital. In many hospitals, however, committees have been set up to review the quality of medical care of patients while they are still in hospital. These committees consist of highly trained clinicians, each of whom reviews the care of a stated number of patients and recommends consultation or other modification of treatment.

These measures have produced an improved standard of medical care in those hospitals where they have been instituted, and it is likely that in the accredited hospitals in Canada the standard of medical care is good.

It is much more difficult to appraise the quality of care provided by an individual practitioner to patients seen in his office and at their homes. Nevertheless, new approaches to this problem are becoming apparent. Prepaid medical plans have provided the profession with unexpected information. Analysis of the accounts submitted bring quickly under scrutiny the physician whose pattern of practice is unusual. Such deviations are not always due to poor practice, but this examination can reveal those that are signs of ineffective medical care.

A further example of an attempt by the profession to assess its performance is reported in the book *The General Practitioner* by K. F. Clute. The survey from which this report emanated had been instituted by the College of General Practice in 1955 as an attempt to evaluate the quality of care which the general practitioner in Canada was providing. The report established that, on the basis of an arbitrarily selected standard:

1. The majority of physicians studied met the standard.
2. A significant number of physicians studied failed to meet the standard.
3. Larger numbers of older than younger physicians failed to meet the standard.
4. A significant number of physicians worked longer hours than are considered reasonable by other professions and by trades. These overworked physicians produced, in the main, excellent scores. (A subsequent study should examine whether or not the poorly performing, older physician of to-day, is the overworked, good physician of yesterday.)
5. In the rapidly advancing world of medicine to-day, the general practitioner finds it difficult to keep abreast of the changes in the management of his patients that new discoveries dictate. This is particularly difficult for the man in solo practice in a small community, at some distance from a medical school.

What is to be done about these inadequacies? Are we to embrace the punitive approach as in the Code of Hammurabi?[1] There is little evidence that punitive measures have ever improved the quality of medical care. Further, before the defects for which disciplinary action may be meted become apparent, it is likely that many patients will be damaged.

The alternative to disciplinary action is prevention.

There are a variety of steps that can be taken to prevent the conditions disclosed by the survey conducted by Dr. Clute and his colleagues of the College of General Practice:

1. The performance of a physician is not only the product of his training but a reflection of his fundamental character, his motivation, his sense of values, his ideals and his desire to serve. Many of these factors are genetically determined, others stem from his family environment. The problem facing the Selection Committees of Medical Schools is the assessment of these qualities. At the present time we do not possess the necessary techniques to make the wisest selection of applicants to medical school. Support should be directed into research into this important field of selection.

2. Undergraduate medical education must provide the environment in which the student assumes the responsibility for his own learning. Only under these circumstances will he be equipped to keep abreast of advances in medicine after he graduates and becomes a practitioner. To achieve this end in undergraduate medical school the student must be exposed to a basic curriculum occupying 50–75 per cent of his time, and opportunities to study in depth areas of his own choosing under the supervision of qualified teachers. Much of the teaching has been of a didactic nature, because of lack of funds and of clinicians trained to do bedside teaching. The burden of teaching in medicine is not readily understood even by educators; bedside teaching must be done with groups of five or six students; this requires a very large number of clinical teachers.

Medical education in Canada could not have come close to meeting its needs without the dedication of part-time teachers in the clinical departments. Over 3,000 physicians who make their living in private practice and maintain offices with secretarial and nursing staffs in downtown office buildings spend up to half of every day at teaching and research in medical schools and their affiliated hospitals. In return they receive the stimulation of contact with students and recent graduates, and, from the financial point of view, an honorarium of $100 to $1,000 per year. Perhaps their greatest satisfaction comes from the sense of having fulfilled the spirit of the Hippocratic Oath.

The development of medical education on a basis where it stimulates the medical student to seek his own learning requires two things:

(a) A sharp increase in the number of physicians employed on a full-time basis for teaching and research, and

[1] The Code of Hammurabi, 2270 B.C., Article 218.

(b) A much more satisfactory remuneration of the part-time teachers for the time and effort which they put into teaching. A reduction of didactic teaching, and encouragement of the student to seek his own learning will require more instructor-time than any Canadian medical school can now afford.

3. Further studies must be undertaken similar to that pioneered by the College of General Practice and reported by Clute. These studies should be instigated and performed by the profession and should cover all aspects of medical care. It is probable that, as in the recently reported investigation, there will be revealed evidence of some other inadequacies of medical care and hints as to how they can be corrected.

4. The responsibility of determining the qualifications of those who offer medical care at the present time rests with the provincial licensing bodies. Criticism could be directed toward the fact that a licence to practise is rarely cancelled except on evidence of serious misdemeanour, usually established in courts of law. The suggestion has been made that a licence should be terminal and should be re-issued only after demonstration of satisfactory professional performance, and that a system of re-examination might be established at regular – perhaps five-year – intervals.

Such a procedure would present certain problems. What does the licencing body do about the physician who practises an inferior quality of medicine? Does his removal from practice in a small community assist or harm the health care of the patients he serves? Is an inferior physician not better than no physician at all? To discipline a physician for failing to maintain standards under the difficult conditions described in the study initiated by the College of General Practice does not seem as constructive as to attempt to correct these conditions. While in the future it may be necessary to consider some such re-licensing system, to do so without providing the means for the physician to learn the advances in his profession would be unjust.

5. One of the ways in which physicians keep themselves up-to-date is by regular contact and discussion with their colleagues. The relatively high standard of care provided in hospital is due in part to the fact that the physician's work is under the scrutiny of his fellow physicians, and he has access to their assistance and advice. The lonely life of the solo-practising physician does not permit this mutual assistance and support. Every effort should be made to encourage group practice plans which foster interchange of information and mutual assistance.

6. The previously discussed measures will only be effective over a long period of time. An immediate attempt should be made to provide for the practising physician the means to keep himself up-to-date with rapidly expanding medical knowledge. This requires that medical schools accept the responsibility for the task of projecting new knowledge to the practising profession by the use of techniques which have been established in a few Canadian schools. This means a heavy increase in the teaching load on medical

schools and, as described in Chapter 8, it requires significant supplements to teaching staffs and budget. Nevertheless, in this expansion of the role of the medical school lies the challenge and hope for the future of medical care in Canada.

OPERATIONAL RESEARCH IN HEALTH SERVICES

The preceding section has dealt with conditions and circumstances that may vitally influence the effectiveness of medical care. Recognition of inadequacies and measures for improvement should be matters of concern to the members of the profession, and they should be responsible for corrective measures – through the medical schools, hospital groups, and organized professional groups at every level.

There is another important area, constantly increasing in scope, which deserves careful and continuing observation, viz. the methods by which governments, whether federal, provincial or municipal, seek to improve the quality and availability of health services by various legislative measures and regulations.

Dr. Feldstein[1] in a critical review of a recently published series of papers,[2] refers to the development of operational research during World War II , and its great value in solving some of the complex problems which were presented to those responsible for the conduct of the war. He admits that many questions in health services are "too broad, and too dependent on intangible factors" to be answered by the techniques of operational research, but he is certain that these techniques can be applied to many of the problems faced by those responsible for new plans. One of the difficulties is to determine what is "need", and what is "optimum" for a given society. In every instance cost must be considered. Should costs of health service prejudice education or other community objectives? How do we determine what is optimum at a given period of our national development?

The members of the group are of the opinion that coincident with the introduction of universal medical care plans, arrangements should be made for some type of continuous evaluation of methods. Depending on the results of such operational research, the necessary modifications could then be promoted.

We have been fortunate in having a very close association during our studies with the Director of Research, who is a sociologist with special knowledge and interest in the medical field. He has put forward in this, the concluding section, certain objectives for operational research and some suggestions for the establishment of an organization under which such research could be effectively carried out.

"INSTITUTE OF HEALTH STUDIES"

In 1961 a total of approximately $2,311,000 was spent on health services. This is more than double the outlay eight years earlier. Despite this outpouring of national wealth it was not until the setting up of the Royal Commission on Health

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[1] Feldstein, M. S., *The Lancet*, March 2, 1963, p. 491.

[2] *Towards a Measure of Medical Care – Operational Research in the Health Services*, A Symposium, London: Oxford University Press, 1962.

Services in 1961 that a systematic effort was made to assess the effectiveness of the wide variety of health programmes which it supports. It would appear that because we are all agreed on the goal of this activity – the relief of suffering – we fail to evaluate critically the means used to reach it. There is little doubt that increased financial outlays will be required even if the present system of health care in Canada remains unchanged. Should significant changes occur, either in the provision of services or in the method of paying for them, it seems obvious that much larger increases will be required.

With these outlays there will emerge a demand for a continuing critical evaluation of the rationale underlying the organization of health care, as well as objective, systematic evaluation of particular programmes, facilities and professional services. The demand for such studies forms part of a large number of briefs submitted to the Royal Commission on Health Services. These evaluations would be concerned with the organization and operation of programmes, facilities and services, but not with medical research or research in allied basic science fields.

Who should undertake these responsibilities? At present, government, federal and provincial, appears to be the only agency with the financial resources. Government, however, is intimately involved in the activities that should be studied and evaluated. It is therefore unrealistic to expect it to be self-critical to any great extent, especially when such an evaluation may mean the restriction of responsibility and for some, perhaps, the loss of a job. This points up to two main supports upon which the organization undertaking this type of research must be based: adequate financial support and a high degree of independence especially in relation to the various levels of government and the health professions. This organization might be called "The Institute of Health Studies".

Functions

1. The Royal Commission on Health Services has undertaken a number of studies dealing with supply and demand aspects of various categories of health personnel; their education and utilization; the distribution and utilization of health facilities; the health status of the Canadian people; the financing of health care, and others. These will indicate the gaps in our knowledge and thereby serve as the basis for future studies. There are some areas of health which, according to its terms of reference, the Commission was not required to study. Even if the Royal Commission had studied the entire field of health and health services, or if this were achieved by continued studies in the future, a continuing research programme would still be necessary in order to keep pace with continuing and probably accelerating technical and social developments, and changing health and morbidity patterns.
2. The present system of health care involves a wide variety of programmes, health institutions, and health personnel. The particular purposes and goals of these three components of our health care are well known, but seldom, if

ever, are attempts made to ascertain the extent to which these purposes are served or the goals reached. Particular programmes are launched without serious preliminary testing; the operations of the programmes are seldom systematically evaluated for their effects; health institutions are seldom studied for their operational effectiveness according to serious criteria, nor are they analyzed for their reaction to the introduction of health programmes; and only now are we beginning to investigate the effectiveness of the services rendered by health personnel. These evaluative functions of the Institute would be the focus of much of its activities.

3. A serious hindrance to undertaking the type of research noted in (2) above is the shortage of suitably trained personnel. Projects of this nature require professional staff from a variety of fields such as medicine, dentistry, psychiatry, nursing, economics, sociology and others, who are trained in the methods of evaluation research. These methods are not those of the basic science laboratory, but have been constructed mainly in the areas of the social science. For example, to ascertain the effective demand for different "benefit packages" offered by different prepayment plans requires the research skills of the economist; the evaluation of the effect on the population of a particular health education programme would require the research skills of the sociologist; but to estimate the impact of, say, the National Hospital Insurance Programme on hospital standards and utilization would require the combined knowledge and research skills of a physician, and economist and a sociologist- The Institute of Health Studies would offer fellowships for training in evaluation techniques to suitably qualified individuals in the fields of interest represented in the Institute.

4. If provincial claims concerning the introduction of medical care plans become matters of fact, it is inevitable that the demand for medical care will change. This will have significant consequences for the organization of health care, and will result in the emergence of new problems requiring experience in, and knowledge of, the health field for their solution. The personnel of the Institute would provide the necessary consultative services for those agencies directly concerned with these problems.

Organization

1. One crucial aspect of the organization of the Institute should be its independence with respect to the many institutions, agencies, and government departments which are now involved in the health field. This independence is essential if the Institute is to evaluate objectively and critically, health programmes, the activities of individuals and of health institutions. Without this objective independent evaluation weaknesses in these areas may be perpetuated. This independence also ensures that the Institute will be insulated from pressures from particular groups for studies which they consider important for their interests.

2. In addition to an independent policy, and in order to ensure that such a policy can be followed, the Institute should be financially independent of the groups which it serves. In the first instance, therefore, funds might be sought from foundations or from the Federal Government through a block grant, or a combination of the two. As its research operations progressed the Institute could undertake studies for the federal and provincial governments and other bodies on a contractual basis. It might also seek support through the National Health Grants. Eventually, after it had given ample indication of its effectiveness, it might seek the financial support of all levels of government providing suitable safeguards for the independence of the Institute could be assured.

3. The combination of the skills required to undertake the above research activities include medicine, dentistry, nursing, economics, and sociology. It is possible that additional skills will be needed as the Institute's research programme gets under way. This nucleus of skills would be employed within the Institute, but in order to facilitate its research operations, the Institute would provide research grants to suitably qualified persons outside the Institute who would undertake specific projects either within a university or in some other context. A fellowship programme could be instituted in order to train qualified personnel in the skills required for this type of research, and to to provide some help in the operation of the research programme.

4. The context within which the Institute is located is an important element in its aim of independence. It seems obvious that, in order to ensure independence of action, it should not be a direct federal or provincial government responsibility. For the same reason it should not be the responsibility in whole, or in part, of a professional body, or health agency or agencies. It could be argued that it should be a completely autonomous organization. Such an organization, however, would be relatively unprotected in its initial stages of growth from the possible criticisms and pressures of those whose interests may be affected by the Institute's research programme. In addition, it would be difficult to attract qualified personnel to an organization whose future seemed beset by criticism and pressure from the beginning. Complete autonomy could also affect the availability of data from the organizations, institutions and groups whose activities might be examined. Without the confidence of the professional groups in the health field the Institute would have a very limited future. These difficulties could be eased, if not overcome, if the Institute became an integral part of the structure of a university. Universities have used the Institute arrangement to further particular studies, although the relationship of the Institute to the university, and its financial support, take a variety of forms. The Institute of Health Studies would need to draw upon the university academic community for some of the skills necessary to carry out its research programme; it would need the university to attract candidates for fellowships; to provide the teaching resources necessary for its training programme; and to gain the confidence of the health professions and institutions whose operations it would study. Because of the nature of its activities the Institute should not be the responsibility of an

organized university faculty, department or group in the health field. Nor should it be the responsibility of any university teaching or research department. It should be part of the faculty of graduate studies with an advisory council consisting of representatives of the cooperating university departments, the professional bodies outside the university, and federal and provincial governments.

An alternative arrangement would be a national organization financed by the federal government and directed by a full-time director with a suitably qualified staff. The central research staff would undertake a limited number of studies. Most studies would be delegated to qualified individuals and appropriate university departments and faculties.

There are other possible forms of organization for the Institute either within the university structure or outside it, but whatever the eventual organization it should be based on the fundamental condition of independence.

The Research Programme

The following is a list of the types of studies, stated in very general terms, which the Institute would undertake in its first five years.

1. Continuing studies of the manpower supply and demand in the health fields. Besides examining the flow of individuals into and out of the health professions these studies would examine the conditions affecting recruitment into the health profession, the educational process, and the utilization of professional time.
2. The impact of the Hospital Insurance and Diagnostic Services Act on hospital organization, utilization and quality of care.
3. An examination of the operation of local medical markets to indicate the significant differences between metropolitan, urban and rural areas in the patterns of supply of, and demand for health services.
4. The impact of prepaid medical care programmes on the demand for health services, and on the quality of care.
5. An evaluation of the operation of local community health facilities and programmes, public and private, to determine their effectiveness in terms of their stated aims.

CONCLUSIONS

1. There should be established, coincidental with the introduction of any universal medical care plan which is instituted on a federal sharing basis, an "Institute of Health Studies". The objectives of this organization might be described as continuing operational research in hospital and medical care insurance plans.

2. It might function as a division of the Medical Research Council, but should have its own director, and its own specially selected council representative of the provinces, the medical schools and the professional organizations.
3. Its finances might be derived from the Federal Government as federal contributions to medical care and hospital insurance plans.
4. It should work closely with universities, but it is important that it should have a nucleus of highly-trained personnel capable of carrying out research themselves, who would encourage the training of new personnel, and stimulate research projects in the universities.
5. The administrative offices might be in Ottawa in association with the Medical Research Council, or as suggested in the memorandum, at a university in Ottawa or elsewhere.

CHAPTER 16

SUMMARY OF CONCLUSIONS

PERSPECTIVES IN MEDICAL EDUCATION

1. Medical education is in a state of unprecedented ferment. Its problems are best understood in their historical, social and scientific context. At the heart of the new movement is the more deliberate effort to define its tasks and to use scientific method to improve every aspect of its activities.
2. The opportunity is noted in Canada for an effective approach to the many problems of medical education through the Association of Canadian Medical Colleges with its affiliation to the Canadian Universities Foundation and its close relation to Canadian professional organizations, and to medical education associations in other countries.

THE MEDICAL STUDENT

1. That universities which support Faculties of Medicine, explore with their respective Provincial Departments of Education, the possibility of arranging special advanced courses of instruction in secondary schools, by which selected and capable students might be matriculated directly into the study of medicine, with the saving of one or two years of study over the prevailing practice.
2. That, in view of the limited number of places available in Canadian medical schools and the wastage in the first professional year of training through failure and indecision, present methods of selection of students be carefully studied, and new methods and techniques of selection be explored.

CURRICULUM

1. Medical schools should begin to enquire more closely into the recommended pre-professional education of candidates who expect to enter medical school and to recommend such courses as are available and relevant in the social sciences. The possibility of establishing, in faculties of arts and science special combined honour courses in the social sciences and the natural sciences should be explored.

2. That curricula and methods of teaching in medical schools be under constant revision, and that the provincial licensing bodies and the Medical Council of Canada be enjoined against setting up regulations which will interfere with flexibility.

3. That medical schools be encouraged to use the block system of teaching in the third and fourth years of the professional course, and to reduce didactic lectures in order to promote methods of teaching which require student participation.

4. That curriculum reorganization engage the student in continuous study and experience during the last 22 months of the course, and that the student during his final year act as a clinical clerk in a teaching hospital, substituting for junior rotating graduate intern.

5. That during the last two years of the course, the Canadian medical student receive an outright scholarship of $2,000 *per annum*, dependent upon satisfactory progress.

6. That, assuming that the clinical clerkship in the final year carries responsibility to patients, the various provincial licensing bodies, the Committee on Internships of the Canadian Medical Association, and the Royal College of Physicians and Surgeons of Canada, might agree to revise current regulations concerning the rotating internship of the pre-registration year.

7. There is need for study of the best approach to community health requirements and the means by which these requirements are to be met. There is need for study of the nature of present-day practice. There is need to evaluate our teaching in relation to practice as it evolves in face of rapid change, and there is need to introduce students to the practice of medicine in the community. We would welcome an experiment whereby, through an active out-patient department of a teaching hospital, arrangements could be made for the total care of a segment of the community limited in numbers to the requirements of teaching and research. This would imply active co-operation with the local branch of the College of General Practice as well as with the whole orgainized profession. Such a plan would require special financial arrangements and close relation to the Department of Social and Community Medicine of the school.

8. As an alternative to the conclusion in No. 7 above, we would favour the establishment in teaching hospitals of Departments of General Practice, the staff members of such departments to be specially selected, well-qualified family practitioners in the immediate community. Such departments might include in-patient services in medicine, psychiatry, obstetrics and paediatrics. Staff positions would be held on the same joint basis as in other departments, but the university rank might be established in the Department of Social and Community Medicine.

9. That present practices in the examination system of the Canadian medical schools be reviewed, with the possibility of providing means of assessing progress and fitness for promotion, other than by year-end formal examinations.

THE MEDICAL SCHOOL

1. That medical schools continue to be active and integral parts of universities, and that new schools be planned only in those universities which are aware of the responsibilities involved, and are willing to give full support to the plans. In planning a new medical school, an early step should be the appointment of a full-time dean who should be medically qualified, have the training and experience necessary to hold an even balance between the basic sciences, the clinical fields and the development of research.

2. The medical schools should have the means to employ more geographic full-time clinical teachers and investigators. Remuneration, combined with the advantage of a university pension, should not be significantly less than the net earnings in consulting practice, after such deductions as the expenses of office and secretary which the man in private practice must provide. We are reminded that, in the United States, very large sums have been made available to allow schools to employ full-time teacher-investigators at salaries ranging from $15,000–$25,000.

3. That part-time clinical teachers be adequately compensated.

4. That in all agreements to be negotiated between universities and hospitals used for undergraduate teaching, there be a provision that the university shall be represented on the governing body of the hospital, by persons recognized as fully accredited and active members. (Should the hospital be owned by a religious order, the school representatives might sit on the advisory board.) That the representatives include the President of the university and Dean of the medical school (or their representatives), and at least two heads of clinical departments.

5. In the larger universities which have, as well as a Faculty of Medicine, faculties or schools in other health sciences fields, consideration should be given to a grouping of all these schools and faculties in a health sciences centre. Where it is planned to establish new medical schools with university sponsored hospitals, the planning should be in line with this health sciences centre principle.

   The responsibility for the operation of such a centre should be vested in a small committee consisting of representatives of the Board of Governors of the university, the Deans or Directors of the schools within the centre, and the Administrator of the university hospital, which is an integral part of the

centre. Different patterns of administration will no doubt emerge, but the main principles are: (1) academic responsibility stemming from the Senate, but with some local autonomy for the management of courses of less than degree status; (2) financial and administrative responsibility stemming from the Board of Governors of the university, but vested in a small committee which should have considerable experience and interest in finance and general administration.

On the financial side, we suggest decentralization under a separate financial officer who would work very closely with the university comptroller. Indeed, we believe that the finances of a medical school, even under the present circumstances, are of sufficient complexity to warrant a separate financial officer who, although he might have his office in the Faculty of Medicine, would continue to work closely with the central financial administration of the university.

THE FINANCING OF MEDICAL SCHOOLS AND TEACHING HOSPITALS

1. That amendments be made to the Hospital Insurance and Diagnostic Services Act, to permit the inclusion of appropriate charges entailed in medical education and research.

2. That the recommendation of the "Farquharson Report" that federal funds be provided immediately for the setting-up of adequate research facilities in Canadian medical schools and teaching hospitals, be implemented.

3. That half the capital cost of the erection of new basic medical science buildings in existing schools and all new schools should be met by grants from federal sources.

4. That the hospital construction grants programme of the Federal Government be modified to provide capital construction grants of at least 50 per cent of the cost of hospitals operated by universities, and of teaching units in general hospitals to a maximum of ten beds per member of the graduating class, in each medical school in Canada.

5. That universities which offer medical training receive support for the operating budget of the schools to include: (a) at least 50 per cent of the salaries of university staff members who devote a major part of their time to hospital functions, (b) a direct grant of 25 per cent of the previous year's cost of supporting the school, exclusive of research grants.

6. That, if a nationally supported plan for prepaid medical care be instituted in Canada, any necessary legislation be enacted which will permit medical schools to collect fees for services rendered to patients by salaried university teachers.

7. That funds be provided to medical schools to support an expanded programme of continuing medical education.

TRAINING OF TEACHERS AND INVESTIGATORS

1. That the present support of graduates proceeding to master's degree and doctorate in basic and pre-clinical science departments now provided by the NRC and MRC be continued and expanded.
2. That salaries of teachers and research workers in basic science departments be increased.
3. That the value of research fellowships provided by NRC and MRC be increased by $1,000; and that stipends for Scholarships and Associateships offered by the MRC be raised to the level which will attract trained scientists to posts in Canadian universities.

POST-GRADUATE AND CONTINUING EDUCATION

POST-GRADUATE MEDICAL EDUCATION

1. That, in the interest of the training of the graduate for family practice, the regulations concerning the pre-registration internship be modified so as to permit greater flexibility.
2. That the College of General Practice, in consultation with the Association of Canadian Medical Colleges and the Royal College of Physicians and Surgeons of Canada, consider the development of a programme of training and suitable examination for Specialist Personal Physicians.
3. That the Association of Canadian Medical Colleges be requested to develop courses in anaesthesia of two years duration, to provide the skilled anaesthetists needed.
4. That the need for medically qualified bacteriologists in teaching hospital be recognized by the provision of attractive remunerations.
5. That the programme of training of specialists as developed by the Royal College of Physicians and Surgeons of Canada be continued, with such modification of flexibility as may be achieved without sacrifice of quality.
6. That federal-provincial grants be provided for the construction of Clinical Investigation Units in university-affiliated teaching hospitals.
7. That clinical investigation units in university-affiliated teaching hospitals be supported in part under Dominion-Provincial Hospital Insurance plans.
8. That the proportion of clinical investigators on the membership of the Medical Research Council be increased.
9. That the terms of the training-grant programme of the Department of National Health and Welfare be broadened to include support for graduate training not now covered by Resident Training programmes and Research Fellowships.
10. That a portion of the salaries of full-time teachers in clinical departments in university-affiliated teaching hospitals be provided by federally-supported provincial hospital insurance plans.

CONTINUING MEDICAL EDUCATION

1. That all medical schools develop vigorous programmes of continuing medical education under divisions of post-graduate education.

2. That the cost of attending a programme of university-sponsored post-graduate training be deductible from income for taxation purposes.

3. That part-time clinical teachers in medical schools be allowed to deduct from income the cost of attending four medical meetings *per annum*.

RESEARCH

1. That the Department of National Health and Welfare, Defence Research Board and Department of Veterans Affairs be encouraged to continue their programmes of extramural research within their own special fields of interest.

2. That in the Department of National Health and Welfare, the intramural research projects be reviewed and assessed periodically by experts not on the professional staff of the Department.

3. That the Department of National Health and Welfare arrange to simplify the procedures in the award of extramural grants-in-aid of research, and in the accounting related to awards, after the pattern adopted by the Medical Research Council.

4. That the Government of Canada regard the Medical Research Council as its principal adviser and chief instrument in the support of its research programme in medicine.

5. That in the Act of Incorporation of the Medical Research Council, there be made provision for the inclusion, among the members, of public-spirited non-scientific persons, one of whom whould be appointed Chairman.

6. That the operating budget of the Medical Research Council be increased liberally and progressively, by an amount which will enable it to expand its current programme and offer additional means of support for research. An annual increment of $2 million for the next five years is proposed.

7. That, in addition to its operating budget, the Medical Research Council be provided with funds sufficient to make capital grants for the erection and equipping of essential research facilities in the universities and affiliated teaching hospitals, the details to be determined by the Medical Research Council in conference with the Association of Canadian Medical Colleges.

8. That the Medical Research Council be encouraged to increase the number of Research Associateships, Scholarships and Medical Research Fellowships for appointment in the medical schools.

9. That the Medical Research Council, Department of National Health and Welfare and Defence Research Board made available in operating grants, items for the support of the medical library in the institution from which the application comes.

10. That the Medical Research Council include in each grant an allowance to the institution at which the grantee is employed, to assist in the indirect cost of administering the grant.

MEDICAL MANPOWER

1. Canadian medical schools should now increase the annual graduation of *Canadian* physicians to approximately 900, and in the succeeding four years to an average of 963.

2. The University of Sherbrooke now in the planning stage of the development of a Faculty of Medicine should graduate its first class of 40 in the spring of 1971.

3. Assuming a continued immigration of doctors of 400 each year and the implementation of the above recommendations, the present physician-population ratio should be maintained until 1971.

4. In order to maintain such a ratio in the succeeding 10 years (1971–1981) there should be established four new schools to begin graduating students in the successive years of 1972, 1973, 1974 and 1975. (This means that they should open their doors to applicants in the four succeeding years 1968–1971.)

5. Following 1972 there will need to be additional expansion of existing schools or plans to establish further new schools.

6. Even with the most sanguine expectations from the expansion of our educational programme we would lose ground if our assumptions regarding gain from immigration should prove to be incorrect, that is if our gain from immigration was substantially less than 400 per year up to 1971.

7. Continuing attention and study must be given by competent authority to questions of medical manpower requirements of the future.

8. We have encountered considerable difficulty in determining accurately the various data on numbers of practising physicians, the movements of doctors from province to province, movements to and from the country, and other pertinent information. The establishment of an active national register of physicians is an urgent need.

9. There should be initiated as soon as possible a study of the loss of Canadian medical personnel to the United States. The obligation on the part of all Canadian medical graduates to do their first or pre-registration internship in Canada, would help to solve the present shortage of hospital interns and would probably work towards a reduction in the immediate and permanent loss of young Canadian doctors to the United States, (see also p. 261).

EXPANSION OF EDUCATIONAL RESOURCES

1. Completely new university Health Sciences Centres to be constructed in the late '60s and early '70s, of which four are recommended are likely to cost between $25 million and $30 million each.

   Each new school of the size proposed should count on a basic budget of $1.5 million. The larger schools will require from $2 to $2.5 million.

2. There is need for the establishment of central and regional bibliographical facilities as well as remedial grants to existing medical libraries, libraries for new medical schools and teaching hospitals. To provide such basic and modernizing support will require a capital outlay of $6 million.

3. An immediate programme on an emergency basis is urged, to increase the supply of teachers essential to the desired expansion of educational facilities in the health professions. The steps in such a programme are underlined in the discussion on the expansion of medical facilities but are also stressed in Chapters 8, 9 and 10.

PARAMEDICAL MANPOWER IN CANADA

1. As many as possible of the members of the paramedical and related professions should be educated and trained in conjunction with other members of the health team. A grouping of teaching and exemplary service in the Health Sciences Centre would facilitate such an objective.

2. Some uniformity of subsidization or financial support of paramedical workers is desirable.

3. Teachers in the medical schools should be associated with the paramedical groups on the various national committees which control standards of teaching and final examinations.

4. There is need in Canada for the establishment of two schools of out-post nursing. These schools will need federal and provincial support. Dalhousie Medical School in the east and the University of Alberta Medical School in the west would be appropriate centres for these schools.

5. There should be established as soon as possible training schools for refractionists. This implies the concurrence and active interest of the Canadian Association of Ophthalmologists and particularly such members as are engaged in active teaching in medical schools and Health Sciences Centres.

PUBLIC HEALTH AND PREVENTIVE MEDICINE

1. That the two schools of Public Health in Canada receive through their respective universities, annual federal grants amounting to 25 per cent of their operating budgets.

2. That these schools share in the federal grants for new buildings and for rehabilitation of old buildings as recommended in Chapter 7.

3. That in each medical school there should be a department known as preventive medicine, community medicine or social medicine. A suitably qualified head should co-ordinate the teaching of preventive medicine in the school but much of the responsibility should devolve on the various clinical departments. It will be useful if the head of the department of preventive medicine has a background of clinical training and practice, and it is recommended that he continue to maintain active contact in the particular clinical field in which he has had experience.

4. That schools of Public Health give early consideration to a revision of their courses of training – particularly the programme for the Diploma in Public Health. There should be a decreasing stress on microbiology and an increasing effort to stress the organization of clinical management of special groups such as the aged, the chronically ill and the disabled. This can only be achieved by close association with the various clinical departments of the medical school.

5. The schools of Public Health if they are to be recognized as the staff colleges for the national health services should give careful consideration to the provision of adequate courses for medical administrators. In some instances this may be achieved by providing electives in a revised Department of Public Health course, in others by offering a second year of concentration in appropriate fields, and in others by specially tailored courses for more mature men who have a background of successful clinical practice.

PROVISION AND MAINTENANCE OF "THE BEST POSSIBLE HEALTH CARE"

1. Coincidental with the introduction of any universal medical care plan which is instituted on a federal sharing basis, there should be established an "Institute of Health Studies" which should carry on continuing operational research in hospital, in medical care insurance plans and related fields. It should derive financial support from the Federal Government through medical care and hospital insurance funds. It should have a nucleus of highly trained personnel who would work closely with the universities in the training of new personnel and the installations of research. The administrative officers of the "Institute of Health Studies" might be in Ottawa, in association with the Medical Research Council, or as suggested in the memorandum,[1] in a university in Ottawa or elsewhere.

D.V.A. HOSPITALS AND THEIR RELATION TO MEDICAL EDUCATION

1. Joint study groups of D.V.A. officers and representatives of appropriate and interested universities should proceed to study the possibility of the universities taking over certain of the D.V.A. active treatment hospitals with the objective of enlarging hospital present teaching facilities and in some instances expanding such hospitals into new medical school clinical centres. See also Chapter 12.

[1] B.R., Blishen, "Institute of Health Studies", Chapter 15.

APPENDIX 1

PARAMEDICAL AND RELATED PROFESSIONS

INTRODUCTION

The term "paramedical" applies to those workers in the health field who are endorsed by and work in close association with the medical profession. Groups such as optometrists[1], osteopaths, naturopaths, chiropractors, are not included in this discussion as they are not considered to come within the group as we understand and define it.

Advances in medical treatment, extensive pre-payment coverage programmes, and an enlightened general public have created a demand for health services hitherto unknown. Skills not generally possessed by physicians are required to provide many of these services. To a greater degree than ever before, physicians are dependent upon nurses, rehabilitation therapists, clinical psychologists, social workers, dietitians and others whose specialized knowledge augments the effort of the doctor. In addition, many of the newer methods of diagnosis and treatment require the use of complex equipment which has necessitated the training of special technicians. Certain laboratory tests and X-ray procedures are typical of services which at one time were the sole prerogative of the doctor, but which to-day are provided by competent technicians.

One has but to examine a list of the recognized paramedical groups of 10 years ago and compare it to a list of recognized groups to-day to realize that specialization in the paramedical field has at least equalled and, in some instances, has surpassed that which has been taking place in medicine. To-day, we have at least 25 groups in the paramedical field as compared with 10 or 12 some 15 years ago. It seems likely that paramedical groups will continue to expand as medicine continues to advance and more and more treatments and procedures are discovered. The paramedical groups will themselves be asked to undertake new and more complicated procedures which again may lead to further specialization.

Hospitals to-day tend towards an organizational pattern which is resulting in three main divisions of structure. The first division includes the doctors with

[1] The practice of optometry in relation to eye care is considered in Appendix 2. Further study of osteopathy and chiropody is being undertaken by at least one provincial licensing body.

their medical staff organization and its various committees. The second is the nursing service with its staff organization through which the treatment as prescribed by the physician is carried out and hospital care is provided to the patient. The third division includes the many supportive groups which have been included in the term "paramedical services". There appears to be a growing problem is clarifying the lines of authority in the hospital structure and the most effective use of its personnel. For example, does the nurse owe her primary allegiance to her seniors in the nursing organization in the hospital, or to the rehabilitation therapists and others with whom she shares the responsibility for the patient? Has she some responsibility to the physician?

The education, training and practice of paramedical groups are of vital importance to the health field. The majority of these paramedical groups will work in the hospital, which to-day is increasingly the health centre of the community, and provides the facilities for a large portion of the doctors' practices. It is important that the training of paramedical personnel should, in large part, be centred in the hospital area. Here they will learn how to deal with patients in a personal manner under the guidance of the physician. Here they will learn of the part which their own group has to offer and also the part played by other groups in the paramedical, as well as the medical fields. This approach to the training of the paramedical groups should develop a mutual respect and understanding between members of the health team, and should reduce the present complexity of the organizational problems in hospitals.

In the following pages we have tried to set down something of the educational requirements and standards, the organizational and legislative arrangements of the many different groups of people with whom the doctor works, and in many instances, on whom he depends for the maintenance of a high standard of patient care. The first group qualify through university education. In several instances graduate degr ees are required. The second group — although for the most part educated in universities — qualify with diplomas or certificates. The third group seek qualifications which are frequently the result of passing an examination arranged by a committee of their own national organization. Their instruction is arranged in hospitals with the active support of doctors who have special knowledge in the particular field concerned, and are usually actively involved in undergraduate and post-graduate medical education.

GROUP I: UNIVERSITY-TRAINED TO DEGREE LEVEL

CLINICAL PSYCHOLOGISTS

Education and Training Programmes

Courses of training leading to a master's degree in psychology are available in all the major universities in Canada. The educational standards are prescribed by the universities. To be recognized as a clinical psychologist, the graduate must have, as well as the M.A. degree, at least five years of experience, mainly in the field of mental health.

Legislation – Membership and Organizations

The Provinces of Alberta, Ontario, Quebec and Saskatchewan have passed acts which determine the qualifications for certification. The other provinces contemplate similar legislation. Membership in the Canadian Psychological Association, incorporated under Dominion Charter, is open to those who have the qualifying degree and experience. There are also provincial associations.

The demand in Canada for qualified clinical psychologists is still greater than the supply, partly because of the large number who emigrate to the USA.

DIETITIANS

Education and Training Programmes

To be eligible for membership in the Canadian Dietetic Association, one must have first the bachelor's degree from a university whose course content meets Association requirements and is offered in a faculty or school of arts, household science, or home economics. At present, there are 16 universities in Canada conferring such degrees.

After graduation, several types of experience will qualify the graduate for membership in the national association. One of these is a successful year's internship in a hospital that has been approved for the training of dietetic interns by the Canadian Dietetic Association. These hospitals are dispersed through all the provinces except Manitoba, New Brunswick, Prince Edward Island and Newfoundland.

There are 22 hospitals and other institutions which participate in integrated internships by providing training during summer months at the undergraduate level for the various periods in the programme, followed by a short post-graduate period. This arrangemen t will take the place of an intern year.

Similar qualifying courses in food administration are provided by certain of the armed services, Courses for food supervisors are available in home ecomonics schools, or by arrangement with provincial hospital associations. In some provinces, training is given on the job to individuals, after which they are given the title "dietary aides" and undertake much of the non-professional work.

A considerable number of vacancies in hospital dietary positions exist across Canada. As present courses in universities are filled, there should be expansion of facilities at the university level; the hospitals certified for dietetic internships can handle a considerably larger number of interns.

There is also a need for additional facilities for training food supervisors and dietary aides. However, such on-the-job training should not qualify the individual as a dietitian. This position and title should be retained for the university graduate.

One of the major problems in expanding the training of dietitians is the obtaining of qualified teaching staff. Teaching vacancies exist in several schools across Canada, due not only to the expansion programme, but to the loss of teachers, mainly to the United States.

Legislation – Membership and Organizations

The Canadian Dietetic Association is incorporated as a non-profit corporation under the provision of the Companies Act of the Federal Government.

Membership in this body is restricted to those who hold a degree from a university whose course is acceptable to the Association, and who have completed satisfactory internships or had equivalent experience. There are provincial associations in which members must usually hold membership in the national body.

The dietetic profession is recognized by a provincial act in seven of the provinces, British Columbia, Prince Edward Island and Newfoundland being excepted. Where provincial acts exist, an administrative board or council is established, with power of certification. Certification is usually automatic with acceptance for membership in the provincial association.

In British Columbia and Newfoundland, the provincial associations are established under the appropriate provincial statute.

MEDICAL SOCIAL WORKERS

Education and Training Programmes

The seven Canadian universities which give degrees in social work are located in British Columbia, Manitoba, Ontario, and Quebec. Candidates for admission must have the B.A. degree. The graduates of one other institution, the Maritime School of Social Work, are recognized by the national body.

The Council of Social Work Education in New York City is the accrediting body for schools of social work. All of the Canadian university schools mentioned above, with the exception of the Maritime School of Social Work, are accredited by the American body. Since approval of the university courses acceptable for membership in the national association rests with this body, it, in essence, sets the educational standards for social workers in Canada.

While in-service courses are given by some provincial governments and private agencies, they do not qualify individuals for membership in the national association, nor do training institutes that are developing for social workers.

There appears to be a need for a less qualified social worker. Were it possible to have two levels of social worker, one at the degree level, and the other at the diploma or certificate level, the shortage of social workers which exists at the present time might be lessened.

While the ratio of medical social workers to the population and hospital beds has improved, and the courses at the university level are filled, there are still vacancies for social workers in Canada.

Legislation – Membership and Organizations

The Canadian Association of Social Workers is incorporated under the Companies Act of the Federal Government. Membership in this Association requires graduation from a school of social work approved by the national association. After January 1, 1964, membership will be open only to graduates who

have completed two years' post-graduate education in a recognized school of social work.

There are provincial associations of social workers established under the appropriate provincial statutes in British Columbia, Alberta, Manitoba, Saskatchewan, Quebec, and Ontario. Membership in the provincial association is extended to members of the national association. The profession would like to move towards a provincial licensing and certification programme.

The Professional Social Workers' Act in Quebec is the only legislation relating to social workers that exists in any of the provinces. Under this Act, there is a restriction of the use of the title "professional social worker" to those who meet specific qualifications.

PSYCHIATRIC SOCIAL WORKERS

The observations concerning medical social workers apply equally well to psychiatric social workers insofar as education, training, and legislation are concerned. Satisfactory practical experience in a properly supervised psychiatric area, preferably in a teaching hospital, is most important for the psychiatric social worker. There does not appear to be any problem in having the two types of social workers. Psychiatric social workers belong to the same national and provincial associations as the medical social workers, and are subject to the same regulations.

There are no separate statutes at the federal or provincial level.

MEDICAL LIBRARIANS

Education and Training Programmes

The basic entrance requirement for enrolment in a School of Library Science is a bachelor's degree in arts, science, nursing, pharmacy, agriculture, etc. In Canada, degree courses which have been given Grade A accreditation by the American Library Association, are offered by the Universities of Toronto, McGill and British Columbia, and courses not yet accredited are available at the Universities of Montreal and Ottawa. The American Library Association programme is accepted by the Canadian Library Association – L'Association Canadienne des Bibliotheques. The bachelor of library science degree is awarded after one year of post-graduate training, and is the equivalent of the American master in library science. In Canada, the course for the master of library science degree lasts two years. There are no Ph.D. degrees in librarianship offered in Canada.

Legislation – Membership and Organizations

All provinces have library associations and statutes relating public libraries which are tax-supported. These library acts are concerned with the organization, development, and administration of various types of public library service. Those

of British Columbia and Ontario include a certification programme for librarians. Certification is not compulsory, in that people may engage in library work whether certified or not.

There is no national association of medical librarians in Canada. The Medical Library Association, a world-wide international association, is the professional organization to which Canadian librarians in the medical sciences belong. There is, however, a Committee on Medical Science Librarians within the Canadian Library Association.

Active membership in the Medical Library Association is open to librarians and other interested people. This Association maintains a certification programme which demands for its lowest grade a bachelor of library science degree from a Grade A accredited library school and a medical bibliography course, which is offered by a half dozen American library schools, the location, courses, and instructors having been approved by the Association's Committee on Standards.

HOSPITAL ADMINISTRATORS

Education and Training Programmes

There are several courses leading to degrees, diplomas or certificates for hospital administrators in Canada.

Two university courses are available. One, at the University of Toronto, provides for a diploma in hospital administration. The other, at the University of Montreal, leads to a master's degree in hospital administration. Both universities require a degree in arts, medicine or the sciences for admission. Each prescribes a nine-month academic year at the university, followed by a year's residency in a hospital accredited by the university. They work closely with the Canadian Hospital Association in the arrangements for course content and practical experience.

The graduates of each of these universities are accepted for membership by the American College of Hospital Administrators.

The Comité des Hopitaux du Québec offers a programme in French, designed to pave the way for the establishment of a post-graduate programme in hospital administration in the French language. At present it is conducted throughout a 30-week period.

The Comité also provides a complete course in hospital administration. It is of three years' duration, two years' theory and one of internship. The course leads to a diploma in hospital administration.

An extension course in Hospital Organization and Management is offered by the Canadian Hospital Association. This is a two-year correspondence course, with one month being spent each summer at a class session. Successful students are awarded a certificate by the Canadian Hospital Association.

Several universities in the United States offer post-graduate courses in hospital administration, which have been taken by Canadians.

The great variation in numbers and content of the courses in hospital administration offered in Canada is symptomatic of the rapid increase in need for hospital administrators. Hospital administration, which had previously been performed mainly by physicians on a part-time basis, has become very complex due to the rapid expansion of the duties and roles of hospitals in the community. Physicians tended to lose interest in the administration of hospitals as this complexity increased. Frequently untrained individuals who had been employed by the hospital in another capacity have been pressed into service as administrators and have taken whatever training they could achieve without leaving the "job". As a consequence, hospital administrators have become concerned more with the financial aspects of hospitals than with their role in the treatment of patients. This trend has been accentuated by the philosophy of certain American schools of hospital administration, which emphasize that their prime role is to administer the hospital as a sound business enterprise. While this is an important function of hospital administration, it is imperative that the very special role of the hospital in providing care to sick patients is not lost.

The sudden post-war demand for hospital administrators is declining, and the time is opportune for correcting defects in the programmes of training. This could be achieved by the following steps:

1. Require close contact between the trainees in hospital administration and other students in the health field, in order to correct the conflicting philosophies which tend to separate the physicians and administrators. If the Health Sciences Centre concept is accepted across Canada, it should include courses in hospital administration.
2. Require that each hospital of 150 beds or more be administered by one who has had a university course in hospital administration and the appropriate internship.
3. Permit a hospital which has fewer than 150 beds to employ an administrator who has received a training in a course provided by the Canadian Hospital Association or equivalent, provided that he has had an internship of one year in a hospital whose administrator has had university training.

Legislation – Membership and Organizations

There is no national association of hospital administrators in Canada. Most professional administrators belong to the American College of Hospital Administrators. There is one provincial association, The Hospital Administrators' Association of British Columbia, but no comparable group in any other province.

There are no provincial acts dealing with hospital administrators.

PUBLIC HEALTH OR SANITARY ENGINEERS

Education and Training Programmes

To qualify as a public health or sanitary engineer in Canada, an individual must hold an engineering degree at the bachelor level (usually in civil engineering)

and have obtained a master's degree in applied science or in public health in the sanitation or sanitary engineering fields, from a recognized School of Public Health. The University of Toronto offers such a graduate course.

The combination of the bachelor engineering degree with a master's in public health, places the control of the educational field at the university rather than professional level, and provides a good basic background for public health and sanitary engineering work.

Legislation – Membership and Organizations

There are no national or provincial associations of public health or sanitary engineers in Canada. The professional association to which this group belongs is the Canadian Public Health Association. However, this body does not accredit courses or training centres, nor provide any special registration or certification of public health or sanitary engineers.

While there is an association of these groups in the United States which conducts examinations, provides certification of its members, etc., very few public health or sanitary engineers in Canada are members.

There are no provincial statutes relating specifically to public health or sanitary engineers. However, since a professional engineer must be registered with the Provincial Association of Engineers, as established under a special statute in each province, there is some degree of control of this group through legislation.

GROUP II: UNIVERSITY-TRAINED – CERTIFICATE OR DIPLOMA

MEDICAL ARTISTS, MEDICAL ILLUSTRATORS

Education and Training Programmes

Medical artists are also called medical illustrators.

The University of Toronto is the only school in Canada which has a course for training medical illustrators. For admission the student must hold an Ontario Grade 13 certificate or its equivalent, as well as a four-year diploma or degree course in art. The course extends over three university terms of 32 weeks each, and leads to a Diploma in Art as Applied to Medicine.

Legislation – Membership and Organizations

Since there is no national association in Canada comparable to the Association of Medical Illustrators in the United States, membership of this group is with the American organization. Steps are being taken to form a Canadian branch.

There are no provincial associations of medical artists or provincial statutes relating to their activities. At the present time, there is a shortage of graduate medical artists, and while the demand is small, openings are available.

PHYSIOTHERAPISTS AND OCCUPATIONAL THERAPISTS

Education and Training Programmes

Physiotherapists (P.T.) and occupational therapists (O.T.) may train at seven universities in Canada. The entrance requirements are senior matriculation or, for those with junior matriculation, one year at university.

Two-year diploma courses are offered in O.T. or P.T. in three universities. A three-year diploma course in both specialties is offered in a fourth. A combined three-year diploma course is available at two other universities, and a four-year degree combined course in P.T. and O.T. at another.

The two national associations, viz. the Canadian Physiotherapy Association (C.P.A.) and the Canadian Association of Occupational Therapists (C.A.O.T.), dictate curriculum requirements which must meet the standards set out by the Rehabilitation Committee of the Canadian Medical Association. An adequate supervised internship is included.

A separate course for occupational therapists of 18 months' duration was initiated at Kingston by the C.A.O.T. in 1959, for which the entrance requirements are a degree in nursing, a B.A., or special qualifications or experience. The diploma is considered to be a somewhat lower level of qualification.

Beyond the diplomate level (or the P.T./O.T. degree at McGill), further training towards a teacher's certificate is available at the Universities of Toronto and McGill. This has been largely utilized by physiotherapists to date, and may be the result of the demand by the C.P.A. that teachers in this field have this qualification. At present, arrangements exist for refresher courses of post-graduate training for the practising therapist.

The question of training P.T. or O.T. aides remains controversial, the bulk of opinion being that the extra help which is currently required should be of a non-professional character and could be trained on-the-job.

An interesting group are the "O.T. Aides" trained for use in the Ontario Mental Hospitals only, whose duties are largely concerned with craft work and other assistance in the O.T. programme, under the supervision of the qualified occupational therapist.

Legislation – Membership and Organizations

Physiotherapists – The Canadian Physiotherapy Association is incorporated under Dominion Charter. Membership is available to graduates of university courses in physiotherapy as approved by the national association. Thus, the national body is charged with the maintenance of standards in the profession. This approval is also referred to in the various provincial acts relating to physiotherapy.

Provincial physiotherapy associations have been formed under the appropriate statutes of the various provinces. There is a close liaison between the provincial associations and the Canadian Physiotherapy Association.

Acts respecting the practice of physiotherapy have been passed in New Brunswick, Nova Scotia, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia. Licensing is mandatory in all these provinces, except Alberta. Some acts require membership in the C.P.A. for registration under the act; in others it is voluntary. Under these acts, qualifications for membership are laid down, boards are established, etc. Only persons registered under the act are allowed to practise physiotherapy within the province concerned.

It is interesting to note the extent of licensing and official recognition by government that has taken place in the physiotherapy field, whereas there has been no comparable control of the practice of occupational therapy through provincial statutes.

Occupational Therapists – The Canadian Association of Occupational Therapists is formed under the Companies' Act of the Federal Government. Membership in this Association is open to those who have graduated from an approved school of occupational therapy and are eligible for membership. Graduates of Canadian schools must have completed all requirements of interning.

There are provincial associations formed under the appropriate legislation in each province. Membership in the Canadian Association is usually a prerequisite to membership in the provincial associations. As there are no provincial acts relating to occupational therapy, the requirement by the Canadian Association that members must be graduates from approved schools,internships, etc., places the direction and responsibility for this group in the national association.

SPEECH THERAPISTS AND AUDIOLOGISTS

Education and Training Programmes

There are two courses offered in speech pathology and audiology, one at the University of Toronto and the other at the University of Montreal. Each is a two-year programme.

They are open to graduates in arts, preferably with backgrounds in psychology, nursing, and teaching. The classes are conducted mainly by basic science departments in the faculties of medicine, followed by clinical practice in the wards and out-patient departments of hospitals.

Legislation – Membership and Organizations

While there is no national association, there are provincial associations of speech and hearing therapists in British Columbia, Manitoba, Ontario and Quebec.

There is no provincial statute governing the licensing of speech and hearing therapists in British Columbia. Members of the British Columbia Association, which is incorporated under the Societies' Act, are described as speech and hearing therapists and teachers of the deaf.

In Manitoba, a provincial statute, Bill No. 43, The Speech and Hearing Therapy Act, provides for the establishment of a board of the Manitoba Speech and Hearing Association. This board makes regulations concerning the conditions upon which members shall be entitled to practise speech and hearing therapy in the province. The statute states specifically that the accredited school or college must be approved by the board. No similar statutes have been passed in other provinces. This group appears to be association orientated.

OUT-POST NURSING

Nursing education did not fall within the terms of reference of this committee. However, the problem of out-post nursing presents requirements beyond the scope of nursing education as it is constituted at present in this country. It, therefore, seems fitting to include a consideration of this problem in this report.

Throughout the more sparsely settled parts of Canada, particularly in its north country, are found many small communities which are quite isolated from larger centres except for communications by radio, airplane and in some instances by ship. The health needs of these small communities are provided by different agencies including the Department of National Health and Welfare, certain religious bodies such as the Church of England, the Roman Catholic Church, and in northern Newfoundland and Labrador by the International Grenfell Association, a non-sectarian voluntary organization which works in close collaboration with whatever religious denomination may be established in a given community.

Irrespective of the agency, the general plan is to set up hospitals of varying size with a surrounding group of satellite nursing stations. The real problem is the staffing of these stations. The nurse in charge is called upon to accept responsibility far beyond that which a nurse is expected to accept in the more settled parts of the country. The nursing stations of this type in the North West Territories, northern Manitoba, northern Alberta, northern Ontario, northern Quebec and northern Newfoundland and Labrador have impressed visitors with the valuable work being carried out by the girls who operate them. However, it comes as somewhat of a shock to realize that very few of these girls are Canadian. The answer of course is that Canadian nurses, with the exception of those from the Province of Alberta, must go to other countries to be trained as midwives. Consequently the majority of the out-post nursing stations are manned by women from the United Kingdom, Belgium, Sweden and the United States. Several years ago the Province of Alberta in co-operation with the Department of Obstetrics at the University of Alberta, established an intensive course of four months duration for these nurses who were to be employed in out-post nursing duty in that province. The number in each year does not exceed six, and of course applicants for provincial posts have priority. On occasions, however, applicants have been taken from Manitoba and other western provinces.

There would then seem to be a need for another school of out-post nursing in eastern Canada and for the necessary arrangements to enlarge the school in Alberta to meet the needs for western Canada.

Financial support for such schools could not reasonably be expected to be provided by universities. Rather, it would seem that the Federal Government and the governments of the provinces concerned might be expected to lend their support to a programme which would aid the provision of health services to people living in the out-post areas for which that government has assumed responsibility.

At the present time, preliminary exploration discussions are taking place at Dalhousie University to determine the feasibility of setting up such a school of nursing in conjunction with the International Grenfell Association. While no fixed policy has been adopted, some thought has been given to a plan whereby suitable young women who have already obtained their RN degree would spend one academic session at Dalhousie, followed by a year of practical experience in the nursing stations of the Grenfell Association. While at Dalhousie, it would be the plan to teach them all the theoretical aspects of midwifery, to permit them to observe and assist in the labour rooms and generally prepare them for a more active participation in midwifery during their period with the International Grenfell Association.

At the same time, they would be given instruction in medicine to increase their ability to recognize the more common diseases, to use antibiotic therapy and other common drugs effectively and wisely and particularly to recognize the seriously ill patient who must rapidly be evacuated to a hospital. They would also be taught simple emergency surgical procedure such as the opening of a superficial abcess and the suturing of a cut. It would also be important for them to learn as much as possible of the care and feeding of infants and of the handling of the more common diseases of infancy which lend themselves to treatment in the home or at the nursing station. Again, the importance of recognizing the infant who should be evacuated immediately to a hospital would be an important aspect of this programme.

During the year with the Grenfell Association, they would have the opportunity of putting their theoretical experience to practical use under the guidance of experienced nurses now in the nursing stations of the Grenfell Association. At the end of this time we think that we would have young women who could fulfil the role expected of them in a highly creditable degree.

The Department of National Health and Welfare employs about 40 nurses a year for work in their nursing stations. When one considers this requirement plus that of the International Grenfell Association and the other agencies operating in out-post areas, it seems reasonable that we should have schools in Canada, one in the east and one in the west.

GROUP III: TECHNICAL TRAINING – IN UNIVERSITIES, HOSPITALS OR OTHER INSTITUTIONS

SANITARY INSPECTORS

Education and Training Programmes

A sanitary inspector must have junior matricuation for university entrance and have satisfactorily completed a course prescribed by the Canadian Public Health Association. In some provinces this course may be taken at an educational institute. (In Ontario, Ryerson Institute – In Quebec, at the University of Montreal.) In other provinces the course is a combination of correspondance and apprenticeship training. However, an individual must be working full-time with an official health agency to be eligible.

The course is nine months, followed by an examination for the certificate – Sanitary Inspector (Canada), C.S.I. (C).

Legislation – Membership and Organizations

There is a Canadian Institute of Sanitary Inspectors formed at the national level. It is a voluntary body with provincial branches of the national association. The national association has representation on the Committee on Certification of Sanitary Inspectors of the Canadian Public Health Association.

There are no separate provincial statutes relating to sanitary inspectors, but Public Health acts require them to hold the Certificate of Sanitary Inspector of Canada – C.S.I. (C).

MEDICAL RECORD LIBRARIANS

Education and Training Programmes

The Canadian Association of Medical Record Librarians has approved 12 schools, operating in hospitals, which provide a 12-month course. Successful completion entitles the graduate to apply for the examination leading to registration with the Canadian association. Entrance requirements are senior matriculation and a knowledge of typing.

There are no degree courses in medical record work offered in universities in Canada, although degrees are given in the United States.

The Canadian Association of Medical Record Librarians and the Canadian Hospital Association offer an eight-month course for the training of medical record personnel in small hospitals. This training is offered at two levels. The first is the eight-month course alone for training of the Medical Record Clerk; the second is the eight-month course with an added intramural session; and for those qualified educationally with Grade 12 standing, the writing of an examination set by the Canadian Association for the diploma of Accredited Record Technician (A.R.T.).

The supply of Medical Record Librarians has not kept up to the increase in population and the expansion of hospital beds. One of the problems to be faced in increasing the number of Medical Record Librarians is the shortage of trained teaching personnel.

Legislation – Membership and Organizations

The Canadian Association of Medical Record Librarians is incorporated under Federal Charter.

There are no provincial statutes relating to Medical Record Librarians; direction of this group emanates from the national association. This applies to approval of educational programmes and registration of individuals for membership. Membership in the national association requires membership in the provincial association, if one exists in the province in which the person applying is employed.

LABORATORY TECHNOLOGISTS

Education and Training Programmes

A technologist qualified for registration with the Canadian Society of Laboratory Technologists is a person who has fulfilled at least the minimum requirements for training and has subsequently passed the certification examinations of the Society. These minimum standards include the completion of at least 12 months' training in an approved hospital training centre. This minimal period will be extended to 18 months in 1964, by agreement with the Canadian Medical Association. The Society maintains close liaison with the Canadian Medical Association, which has established a committee to approve laboratories for the training of laboratory technologists in hospitals. Thus, the control of education and training courses is shared jointly between the Canadian Medical Association and the Canadian Society of Laboratory Technologists.

The Society also approved certain courses given at universities. At the present time there are five universities offering training programmes for medical laboratory technicians. At the University of Saskatchewan and the University of Alberta, a degree in laboratory technology is granted after three years of training. In two medical schools in Quebec and at the Regina campus of the University of Saskatchewan, laboratory technologists are given courses in a division of the medical school, leading to the granting of a diploma or certificate.

In the hospital training centres, the academic requirement for entrance in the various provinces is senior matriculation or the equivalent educational standing.

In the hospital training programme, at least 12 months' instruction is given in the various subject areas, such as general laboratory knowledge, bacteriology, and immunology, before the candidates try examinations for the certificate. At some hospitals this course involves a six-month didactic instructional period

followed by six months in the hospital laboratory where the student provides some service while he is training. It has been suggested that the student trained in this manner is as well qualified as those who spend 18 months in rotation with lectures at intervals, rather than in a block.

An advanced certificate and licentiate may be obtained following further extensive laboratory experience and academic courses. Some of these courses may be taken by correspondence. In some provinces, courses are being established in vocational or institute settings in co-operation with the provincial departments of education.

There is a considerable shortage of technologists across Canada due to the tremendous increase in number and variety of tests used in diagnosis and treatment. Despite an actual increase in the number of trained technicians, the demand has far exceeded the supply.

Legislation – Membership and Organizations

The Canadian Society of Laboratory Technologists is incorporated under Federal Charter.

At the provincial level, there are provincial associations of laboratory technologists incorporated under provincial statutes.

There are no provincial statutes relating to this paramedical group in any of the provinces. This has been stated as a desirable goal, and considerable research has been done in this regard.

Since the approval of educational institutions and certification of members is carried out by the Canadian association, the main control of this paramedical group is retained at the national association level.

RADIOLOGICAL TECHNICIANS

Education and Training Programmes

Programmes for the training of radiological technicians are offered at six university centres in Saskatchewan, Ontario, Quebec, and Nova Scotia. Courses are being set up in British Columbia and Manitoba for instruction of this group in co-operation with the provincial departments of education in vocational or institute settings.

The course for training a radiological technician in either the diagnostic or the therapeutic field lasts two years, and must be taken under a radiologist certified by the Royal College of Physicians and Surgeons, or a diplomate of the American Board of Radiologists. If simultaneous certification is desired in both techniques, this takes three years. The minimum academic qualifications to enter this course are junior matriculation or university entrance. The admission

requirements, general plan of the course, and examinations must be approved by the Canadian Society of Radiological Technicians. This body, in co-operation with the Canadian Association of Radiologists and the Canadian Medical Association, also approves hospitals that have been designated as teaching centres. There are some 50 hospitals so designated, the majority being teaching hospitals.

After May 1, 1966, no candidate will be permitted to sit for examination for certification unless trained in a school approved by the Canadian Medical Association's Committee on Approval of Schools for Radiological Technicians. Thus any non-approved school may not take students for training as radiological technicians after January, 1964.

Legislation – Membership and Organizations

The Canadian Society of Radiological Technicians is incorporated under the Companies Act of the Federal Government. It is a federation of nine provincial member societies. The provincial associations are incorporated under the appropriate provincial statutes. Membership in the national body automatically qualifies one for membership in the provincial associations. The joint council, CAR – CSRT, is comprised of members of the Canadian Association of Radiologists and the Canadian Society of Radiological Technicians. This body evaluates, inspects and approves training centres.

In New Brunswick, Saskatchewan and Quebec, acts have been passed relating to the field of radiological technicians, providing for membership qualifications, certification procedures, etc.

The approval of the training courses and the centres in which they are given by the Canadian Society of Radiological Technicians in co-operation with the appropriate specialty in medicine, places the control of the education in the hands of these two groups. The provincial statutes relating to radiological technicians also make reference to this approval by the national society in its acceptance of the training and educational courses.

The national society is presently working on a course of study which will lead to a fellowship, and on a course of training for isotope technicians.

ELECTROCARDIOGRAPHY TECHNICIANS

These technicians have only recently been recognized as specialists in the paramedical field. While they have been active in hospitals for years, it is the increase in their number and the complexity of their training that poses a problem of training and organization. There are no national or provincial associations nor are there any provincial statutes concerning their activities. There are no standards set up for their educational programmes; most, if not all of their experience has been obtained within the institution in which they are located.

Their training is under the supervision of the cardiologist. As this specialty continues to develop, the field of the cardiography technicians will likely be further subdivided.

ACTIVITY OR PLAY THERAPISTS

This group works under the supervision of the occupational therapist and are sometimes known as occupational therapy aides.

There is no organized or recognized educational programme. Usually training has been received in connection with some type of pre-school or kindergarten programme, rather than that of a hospital. An example of this type of training is that given to privately trained nurses for children in England. However, such courses usually have no medical orientation. They are primarily programmes to amuse children and are taught to lay, rather than to medically orientated individuals. In some instances, the play therapist may have a very superficial knowledge of the patient's illness. Thus, the play programme must be reviewed by the occupational therapist to make certain that it will take cognizance of the illness of the patient.

There are no national or provincial associations or provincial acts relating to this group.

CRAFT WORKERS

The services of this group are mainly diversional, and are supervised by the occupational therapist or physiotherapist. They are sometimes termed therapist aides and are very helpful in nursing homes as well as in hospitals, providing the patients with an interest in themselves and some sort of activity.

There are no organized educational programmes for this group, their experience usually being obtained on-the-job. They have no national or provincial associations or statutes relating to their activities.

INHALATION THERAPY TECHNICIANS

Education and Training Programmes

For the most part, training in inhalation therapy has been by practical experience in certain hospitals across the country. There are departments at the Royal Victoria Hospital in Montreal and at the Vancouver General Hospital.

A joint committee has been appointed with representatives from otolaryngology, internal medicine, the Canadian Thoracic Society, the Canadian Medical Association, and the Canadian Anaesthetists' Society. The purpose of this committee is to establish terms of accreditation and an acceptable curriculum to be covered by individuals in training in an inhalation therapy course. The Canadian

Society of Inhalation Therapists will likely request this committee to commence a programme for registration of their members and conduct examinations. These will likely take place in 1964.

At present, students are maintained on staff in the capacity of student inhalation therapists. During the initial year of apprenticeship, they work in the hospital under supervision, and receive academic instruction. As there is no full-time course, students usually remain on the staff of the hospital that sent them for training.

It is likely that, in future, the main source of inhalation therapy technicians will be through approved training programmes in a certain number of teaching hospitals. For the time being, training will probably be done by personal supervision provided by directors of inhalation therapy services.

Legislation – Membership and Organizations

There is a Canadian Association of Inhalation Therapy Technicians but no provincial associations. There are no standards for membership in the national body as yet.

There are no provincial statutes relating to this group, which is professionally orientated.

ORTHOPTISTS

The orthoptist teaches the patient to use the two eyes together efficiently and comfortably. Orthoptists work under the supervision of ophthalmologists. Their work is chiefly concerned with thorough investigation, diagnosis, and the treatment of anomalies of binocular vision in persons with strabismus. A didactic and practical course in this field is offered each year at the Eye Clinic, Health Centre for Children, Vancouver General Hospital.

A British Columbia Council was established in 1961 by the Eye, Ear, Nose and Throat Section, B.C. Division, Canadian Medical Association. Its examination is conducted by that Section, under authority of the College of Physicians and Surgeons of British Columbia. The Certificate of the Council of British Columbia is recognized in that province.

The Canadian Ophthalmological Society has established a committee to study national and regional orthoptic problems.

The only provincial act relating to orthoptics is the Societies' Act regulating the Canadian Orthoptic Association of British Columbia.

BLOOD-BANK TECHNOLOGISTS AND TECHNICIANS

This group may or may not be registered laboratory technologists. Blood banks whose laboratory technologists are not registered should restrict the activities of these employees to specific procedures and routines, and not

permit them to deal with the whole field of medical technology. The Canadian Society of Laboratory Technologists has written requirements into its programme for certification of blood-bank technologists.

There are no national or provincial associations or statutes relating to this group of technicians.

INTRAVENOUS THERAPISTS

With the increase in use of intravenous therapy, it has been advisable and practical to train individuals to carry out the procedures involved. Often-times, this work has been assigned to a nurse or laboratory technician who had received special training under the direction and approval of the medical staff.

There are no national or provincial associations for this group of technicians, nor are there any provincial statutes relating to their activities.

OPERATING-ROOM TECHNICIANS

The training of this group takes place within the hospital. While there are accredited courses given in the United States, none exist in Canada at present, although there is some agitation for the establishment of a recognized accredited course. Training is now given in Winnipeg, Edmonton, Victoria, Toronto and Halifax.

The trainee for operating-room technician usually has two years ward orderly experience followed by a further six-month period of instruction in the operating-room as a scrub nurse.

At the present time very few operating-room technicians are being used in Canada, but they are prevalent in the United States.

There are no national or provincial operating-room technician societies in Canada. They do exist in the United States. There are no acts relating to operating-room technicians at either the federal or provincial level.

ELECTROENCEPHALOGRAPHY TECHNICIANS

The Canadian Association of Electroencephalography Technicians was formed in 1951. Recently this group made application to incorporate nationally. A liaison committee has been established with the Canadian Medical Association to develop a training programme.

To date the training of E.E.G. technicians has mainly been on-the-job in the E.E.G. laboratories. However, there are two places that do offer courses in this specialty – the Montreal Neurological Institute and the Winnipeg General Hospital.

At present, examinations for certification are conducted through the Canadian Association of E.E.G. Technicians and the Canadian Society of Electroencephalographers, whose members are also members of the Canadian

Neurological Society. An individual must pass these examinations before being eligible for membership in the national association. The standard for entry into the Association is senior matriculation or equivalent.

The demand for E.E.G. technicians is increasing. It is planned to set up a standard training programme in conjunction with universities so as to obtain training in allied subjects. A syllabus for training has recently been developed for this group.

There are no provincial associations or statutes at the provincial level relating to their activities.

MEDICAL PHOTOGRAPHERS

There is no national association of medical photographers in Canada, most of the personnel in this field being members of the Biological Photographic Association Inc., which serves both Canada and the United States.

There are no degrees or courses given in medical photography in Canada, training and experience being obtained on the job and at professional meetings.

While there are no official standards at present, there is a move to establish these in the future through the Biological Photographic Association referred to above.

No provincial statutes exist relative to the activities of medical photographers.

FINANCING OF EDUCATION AND TRAINING PROGRAMMES, FACILITIES AND STAFF OF THE PARAMEDICAL GROUPS

Probably the greatest financial support for the training of paramedical personnel has been obtained through the National Health Grants programme that was established in 1948 by the Federal Government.

Originally, training was provided under special grant categories, but as time went on, the funds made available under the professional training grant were increased in order to consolidate as far as possible all training under the one category. The method of applying the grant has varied between provinces but is has gone far in achieving its objective of training personnel in the paramedical field. When a grant is approved, a contract is usually undertaken, requiring the trainee to return to his employer for a stated period of time after completion of his training. This has encouraged the training of personnel for specific tasks with the assurance that their services will be available in the future and that they will not be lost to the training agency.

Each of the 25 paramedical groups dealt with in this report could be eligible for this type of federal financial assistance for training purposes, depending on individual provincial policies. This support will continue to be necessary if we are to train sufficient personnel to keep up with the expansion that is taking place in the paramedical field.

Another important area of support for the training of paramedical groups is the provision of teaching facilities and teachers by hospitals and other health agencies. The cost of this is accepted in part or in total by the federal-provincial hospital insurance plans, depending on the type of course and manner in which it is operated, but variations in this support produce difficulties. For example, radiographers and laboratory technicians are recognized for training and the costs of their teachers as well as subsidies for the students are accepted under the hospital plan. The same is true of hospital-trained nurses. However, in university training programmes, physio and occupational therapists and nurses are not supported by bursaries, nor are there contributions to the salaries of teachers.

A hospital or health agency may retain an individual on full or partial salary during his training period, often depending on the type of assistance the individual is obtaining from other sources. While the amount of this expenditure that will be accepted by the hospital plans as operating expense of the hospital varies between provinces, it does represent support of training by government.

At the university level, several types of financial assistance are available, mainly for graduate work. Bursaries, assistantships, scholarships and fellowships of different amounts and for different periods of time, are available for training purposes. However, these vary considerably between the paramedical groups, as do the loans, scholarships and other forms of financial assistance that are obtainable through the national and provincial associations.

There is complete agreement that there is a serious lack of funds for the education and training of paramedical students. Whether these monies should be provided mainly from government or elsewhere, is under review at the present time. No matter what their ultimate source, additional funds are urgently needed to supply the trained technicians required.

There is need for some degree of standardization of the financing of these training programmes across Canada, to ensure that an adequate percentage of the funds being paid out by government will flow into these channels. Without adequately trained personnel, both in quantity and quality, no health programme such as is envisaged for Canada can be successful.

CONCLUSIONS

There has been an explosive growth of paramedical groups in recent years, providing assistance to the physician in the diagnosis and management of his patients. These groups have come into being in relatively haphazard fashion. Some are trained in universities where they are faced with high fees and little or no official financial support; others are trained in recognized courses in hospitals and subsidized by Federal Health Grants or hospital commissions; still others are trained "on the job" with payment of full or part salary by hospital insurance commissions.

In quality control of these groups also there are great variations. In some, appropriate groups in the medical profession are responsible for supervision of

the selection and training of the graduate; in others, national and provincial societies have assumed this responsibility and these societies rule on the adequacy of training programmes in universities or hospitals; in a few, there are no professional or supervisory groups in Canada and American professional organizations dictate the acceptability of courses put on in Canadian training centres.

More paramedical groups will probably develop in future and, unless some order is developed out of the varied educational subsidization and quality control programmes, the situation will become increasingly unmanageable. It would seem reasonable that:

1) as many as possible of the paramedical groups be trained in conjunction with other members of the health team – particularly in Health Sciences Centres if these develop as anticipated;
2) some uniform standard of subsidization be available to all groups;
3) appropriate members of the medical profession be involved with the professional committees set up by the various groups;
4) that the federal and provincial governments concerned by urged to assist financially two schools of out-post nursing. There is need for the development of a new school in the east, and Dalhousie Medical School would seem to be a suitable place for such development. With the co-operation of the Province of Alberta and the University of Alberta, consideration should be given to providing instructional facilities to meet the needs for out-post nursing in Western Canada.

APPENDIX 2

OPTOMETRISTS — REFRACTIONISTS

In Canada optometrists should not be included among the "paramedical personnel and related professions" since they practise independently of physicians. Rarely, except perhaps in the armed services, do they work in association with, or under the supervision of qualified doctors. However, because we think there is a role for a person who is trained to offer technical help to the ophthalmologist in the field of eye care, we have thought it fitting that there should be some discussion of optometry.

Optometrists are educated in Canada at two schools, one in Quebec and one in Ontario. The course in Montreal has a tenuous association with the university, but is not within the Faculty of Medicine. The Ontario school is entirely independent of the university and operates under the authority of the Provincial Board of Optometry. Applicants must have a senior matriculation high school certificate or its equivalent; the course runs for four academic sessions. The fees are $525 per year; books and intruments will cost $450, spread over the four years.

Of the 1,411 optometrists in Canada, 80 per cent were educated at the two Canadian schools; the others have come from schools in the United States. The number of optometrists is not increasing; in 1950 there were 1,485. The practice of optometry is governed by provincial statutes.

In practice the optometrists see patients who seek advice about defective vision. They refract or measure the patient's vision in relation to the normal, advise correction of visual defects, and supply appropriate spectacles. They maintain that they are also trained to detect ocular signs of disease, and that they refer patients with such conditions to qualified specialists in ophthalmology.

There are two main subjects of controversy between the medically qualified ophthalmologist and the optometrist. The ophthalmologist holds that anyone who has symptoms referable to his eyes should be seen by a doctor, because the eyes reveal so many signs of serious general disease, that only a person trained in general medicine and specially trained in the diseases of the eye should take the responsibility of giving the patient advice. Moreover, there are several instances, properly documented, where failure of the optometrist to detect the early signs of serious disease has led to the patient's loss of eyesight.

The second subject of controversy is the provincial recognition of optometry as a "profession" with the authority of its practitioners to treat or offer advice on the various conditions which may be manifest to the patient as defects of vision. All optometrists dispense spectacles as part of their practice. When asked what part of the total fee is represented by professional service and what percentage the cost of glasses, some members of the group have said the professional fee would be $4 to $6, but it is known that others tell the patients there is no fee for the examination. This seems a somewhat unusual practice for a professional man. The income of optometrists depends largely on the profit on the sale of spectacles. In other words, optometry is competitive commerce, not professional practice.

There are many good optometrists who hasten to seek the advice of properly qualified ophthalmologists when they suspect anything more than a refractive error. It is generally agreed that there are many optometrists who are sufficiently skilled to note the danger signals of glaucoma, detached retina, early retinal signs of diabetes and other serious and remediable conditions. But when income is largely dependent on the sale of one commodity, where competition is keen, and where the basic training is related to only a limited area of the body and an even more limited field of therapy, it is not surprising that the tendency is to prescribe and sell that commodity. (Optometrists have recently been dispensing an increasing number of contact lenses.) It is highly desirable that refraction – a most important part of the eye examination – should be carried out only by, or under the supervision of, qualified ophthalmic specialists.

There are in Canada about 470 qualified ophthalmologists. It has been estimated that the average person may require seven refractions in the course of a lifetime. Thus, in Canada, there would be a need of 1,800,000 refractions each year. On the other hand, in areas such as Windsor, where refraction by a qualified ophthalmologist is included as a benefit under medical care insurance, the demand is no more than 65 per 1,000 persons at the most. On this basis, we should require in Canada 1,170,000 refractions per year.

The ophthalmologists[1] estimate that, in actual practice, a qualified specialist can see and give adequate medical advice and care, including refraction, to 3,000 patients per year. This would provide 1,410,000 refractions for the whole of Canada – a figure midway between the two estimates noted above.

What is the answer to this controversial question? We postulate that the measurement of refractive errors and advice for correction should be carried out wherever possible under the authority of a medically qualified ophthalmologist. But the ophthalmologist should have auxiliaries trained to do some of the technical work such as refraction. These persons should work in close association with him, whether in hospital clinic, health centre or private office. They would not need the long, expensive course of study such as is now prescribed in Canadian Schools of Optometry.

We are impressed by the way in which the radiologists have evolved the training course and qualifications for radiographers, and how smoothly the radio-

[1] Communication from an officer of the Canadian Ophthalmologists Society.

graphers work with their colleagues. We believe the ophthalmologists would be able to accomplish more work and do it just as effectively if they had the necessary trained personnel to aid them in certain of the technical procedures which are routine measures of diagnosis in medical eye care. We believe that courses of training could be established similar to those designed for radiographers and laboratory technicians.

In the meantime, it is likely that optometrists will continue, under the respective provincial authorities, to practise in a limited field. We doubt if any Canadian university will accede to the request of the Canadian Optometric Association to establish colleges of optometry or sponsor enlargement of or further affiliation with existing schools. We believe the number of applicants for this long, expensive course will gradually diminish; it is therefore all the more urgent that encouragement be given to the organization of courses for refractionists who will work in the closest association and under the authority of properly qualified ophthalmologists.

CONCLUSIONS

(1) That in any medical care insurance plan, payment for professional services in relation to eye care be limited to medically qualified doctors. The payment for spectacles should be under arrangements similar to those for other therapeutic remedies supplied on doctors' prescriptions. Opticians provide this service efficiently.

(2) That arrangements be made as soon as possible for the training of refractionists at suitable centres for eye care in teaching hospitals. The course might be modelled on the existing courses for radiographers. Students registered in courses for refractionists should receive benefits through the hospital insurance authorities similar to those at present available in courses for radiographers and laboratory technicians.

These training courses should have the wholehearted support of the Canadian Association of Ophthalmologists and particularly of the ophthalmologists who are associated with the medical schools. At the present time not all the ophthalmologists would employ refractionists in their offices.

APPENDIX 3

PREVENTIVE MEDICINE, SOCIAL MEDICINE AND PUBLIC HEALTH

UNDERGRADUATE EDUCATION

Of the 12 Canadian medical schools, three have Departments of Preventive Medicine; two have a Department of Public Health and Preventive Medicine (one with the names in the reverse order); two have a Department of Social and Preventive Medicine; one has a Department of Health and Social Medicine and one of Psychiatry and Preventive Medicine. One medical school does not have a separate department, but gives a course under the general title of Hygiene. Two universities have a School of Hygiene for the training of specialists in public health, and these schools are responsible for the teaching of undergraduate medical students in preventive medicine as well.

Of the 10 schools which in answer to a questionnaire, provided information regarding their courses, none indicated that the prevention of chronic diseases was included; eight reported some coverage of the preventive aspects of psychiatry, geriatrics, rehabilitation and paediatrics. Other subjects included by most of the medical schools were: communicable disease control (including tuberculosis and venereal diseases), epidemiology, health statistics, maternal and child mental health, and industrial medicine and toxicology. A few schools also included medical economics, medical jurisprudence and medical ethics, but in most schools these subjects are covered by other departments.

Of the 10 medical schools which reported data on the hours of teaching, two were devoting less than 50 hours; two from 50 to 99; three from 100 to 149; two from 150 to 199 hours, and one more than 200 hours. The average for the 10 schools was 99.2 hours. It is believed that this average is somewhat misleading because both of the French-language schools reported a total of 40 hours, but indicated that other teaching was done in the clinical departments. The average for the other eight schools which reported was 110 hours with a range of 78 to 218 hours. The longest courses were those which were devoted almost wholly to public health and were primarily didactic. It would appear that there has been a reduction in the time devoted to teaching this course from 1954 when data were reported to the Medical Council of Canada that the average was 142 teaching hours with a range of 56 to 224.

It is obvious that different names are used to describe courses of similar content, but it is also clear that there is some variation in the content as well and in the time allocation. Many of the topics mentioned above would also be included in the curriculum of the Departments of Medicine, Paediatrics, Obstetrics or Psychiatry.

These facts point up several questions which have concerned medical educators for some time. Is there, in fact, a separate area of knowledge encompassed by one or more of the terms public health, preventive medicine, social medicine and hygiene? Is a separate department of the medical school required to teach the subject or subjects? What are the functions of such a department in undergraduate teaching, graduate teaching and research? What are the relations between such a department and the preclinical sciences on the one hand and the clinical departments on the other? Is there a clearly defined demarcation between general practice and specialty practice in these areas?

Before attempting to answer these questions it is desirable to consider again the purpose of medical education. As described elsewhere in this report, the goal of Canadian medical schools is the education of a basic doctor, who by further training may become a medical scientist, a general practitioner or a specialist in one of the fields of clinical or laboratory medicine. To achieve such a goal the orientation of the courses in the preclinical years should not be wholly toward scientific research or wholly toward clinical application, but a judicious mixture of both. In the clinical years, as already noted, a balance must be struck between the needs of students who are to become general practitioners and of those aiming to become specialists.

However, there is another important division of medicine which must also be considered by the educator and which has often received insufficient attention in the preparation of a balanced undergraduate curriculum. Medical students, except the relatively few going into medical science, are being educated to provide personal health services either as general practitioners or as specialists. Personal health services required by the individual patient are of three main types:

1. Those designed for the promotion of health and prevention of disease.
2. Those required for the diagnosis and treatment of disease or injury.
3. Those directed towards the rehabilitation of the convalescent patient.

The term "comprehensive health care" has been used to describe the three as a unit.

Canadian medical schools have tended to concentrate their attention in the clinical years almost wholly on teaching students to become proficient in the second of these, the diagnosis and treatment of disease or injury to the virtual exclusion of preventive medicine and rehabilitation. There can be little doubt that proficiency in diagnosis is the primary intellectual skill which must be acquired by a physician if he is to be more than a technician. However, he must also acquire knowledge and skill in the other two aspects of health care either at the undergraduate level or during post-graduate training.

Although most Canadian medical schools have moved in the direction of correcting this imbalance during the last 15 years, medical education is still almost wholly disease-oriented. Teaching in the clinical years is in hospitals where there are excellent opportunities to study the effects of disease and injury, but relatively little opportunity to learn about the preservation of health, unless a very special effort is made. Teaching is also done in the out-patient departments which care for the ambulant sick. These patients often are not so severely ill as those in hospital, but the personal services which they require are still primarily directed toward the diagnosis and treatment of their illnesses. It is true that some out-patient departments also operate clinics devoted primarily to prevention, such as the prenatal obstetrical service and the well-baby clinics in paediatrics. However, in some centers such departments are operated by the Department of Public Health apart from the out-patient department of the hospital. On the other hand, some medical clinics, e. g. for rheumatic heart cases or diabetes, are as concerned with prevention and rehabilitation as with diagnosis and treatment. The crucial point is that the philosophy and interest of the clinical teacher is more important than the departmental organization or the outline of the curriculum. It is certainly not difficult to understand why a clinical teacher, skilled in diagnosis and treatment and faced with the rapidly increasing volume and complexity of his own specialty, may find it difficult to devote adequate time to the other two areas of personal health services. Nevertheless, the fact remains that it is possible for an undergraduate student to receive almost all of his clinical training in the diagnosis and treatment of disease with little or no practical experience in, and no more than nominal reference to, the techniques and services which are necessary to protect the health of an individual. Yet these skills are necessary if he is to be a practitioner of comprehensive medicine.

Nor is this limitation to one area of personal health services experienced only at the undergraduate level. A recently certificated specialist in paediatrics has complained that it is possible for a specialist in that field to obtain almost all of his clinical experience in a teaching hospital caring for sick children, although his eventual practice will require him to devote a large part of his time to providing advice on well-baby care.

Since this section is devoted to personal health services for the prevention of disease and promotion of health, no further reference will be made to rehabilition, except to suggest that in some Canadian medical schools there is a similar lack of practical experience for the undergraduate student. All three aspects of teaching of health care need attention.

It is, in fact, a relatively recent concept that the general practitioner (and, in some instances, the clinical specialist) is responsible for the health of the individual or family under his care. The public has, in general, looked upon the physician as someone who is called upon only in the case of illness, and only then if it is judged to be severe enough to warrant the expense of medical service. The only striking exceptions in recent years have been the growth of prenatal care for the pregnant woman and the supervision of the infant in the first year of life by the

paediatrician or general practitioner. Nevertheless, it is clearly shown by Clute[1] that many physicians have not accepted the responsibility for preventive services or do not carry them out as effectively as other aspects of medical practice. If the future practitioner is to be, in fact as well as in theory, the personal advisor of his patients and their families, a change in public attitude will be required and a willingness to make use of and to pay for health services, and not solely for sickness services as at present. Medical insurance programmes must provide coverage for health care services as well as for sickness.

Of paramount importance, however, is the necessity for the undergraduate student to be taught methods of preventing disease and promoting health in as much practical detail and with as much emphasis on their importance as is placed on diagnosis and therapy. This does *not* mean that equal time must be devoted to these two aspects of personal health services. It does suggest, however, that *all* clinical teaching should inculcate in the student an interest in how the present illness of a patient could have been prevented or the disability could have been limited, together with a concern for the social and environmental factors which may, after discharge from hospital, affect the convalescence and rehabilitation of the patient.

As already indicated, in both undergraduate and postgraduate education consideration must be given not only to the content of the curriculum and the allocation of teaching time, but also to the philosophy of the teachers – their viewpoints on goals to be achieved and on the aspects of a subject to be emphasized. With specific time allocated to cover a certain course, two teachers with different viewpoints will often develop widely contrasting courses and may convey to their students totally different impressions of the values and purposes of a subject. The written description of the courses will rarely reveal the extent of such differences. It is important that the faculty, the dean and department heads ensure that there is some thread of purpose through the whole curriculum as it is actually presented to the student and not simply as it is described in the university catalogue.

If the undergraduate student, during the four years when he is being trained as a basic doctor, has inadequate attention given to two of the three major areas of personal health services, namely preventive medicine and rehabilitation, it is necessary that this deficiency be either corrected in the undergraduate medical course or supplemented in the internship and later years of post-graduate training. The fact of the matter is that the internship and post-graduate education at present are wholly within the hospital and, therefore, disease-oriented. The only hope of developing a practitioner with an interest in comprehensive health care is to do it at the undergraduate level.

The terms public health, preventive medicine, social medicine and hygiene have all been used to describe the area which is concerned largely with the promotion of health and prevention of disease. However, there are certain differences in meaning and emphasis which should be kept in mind. The term social medicine tends to emphasize the environmental, social and psychological factors which play an aetiological role in disease and which may also be of major importance in

[1] Clute, Kenneth F., *The General Practitioner*, Toronto: University of Toronto Press, 1963.

influencing the programme of treatment. In this context social medicine is primarily disease-oriented. This is not to suggest it is less important than preventive medicine. A knowledge of the practical aspects of social medicine is of great importance in diagnosis, treatment and rehabilitation of a patient. But it does not replace the health-oriented viewpoint inherent in the term preventive medicine. It only supplements it.

Public health covers the community health programme, the services provided on a group basis rather than the personal or individual health services. In some schools the term community medicine has been suggested to describe this area of teaching.

Hygiene was a good, all inclusive term, but it lost its general meaning to the advertising man who adopted it for such terms as personal hygiene. It is today rarely used except, interestingly enough, in the name of the University Schools of Hygiene, where public health specialists are trained.

Most Canadian medical schools in the 20 years preceding World War II had a department of public health or hygiene, with courses primarily devoted to public health. They emphasized community health services, mostly those under the Departments of Health, and they devoted much time to the detail of community sanitation and control of epidemic diseases. It was a miniature of the Diploma in Public Health course given to public health specialists. Undergraduate medical students could see relatively little application to clinical practice. These few aspects relating to personal health services, which would become their responsibility as future clinicians, were buried in a mass of detail concerning public health as practised by the specialist. The student obtained no concept of the responsibility of the general practitioner or clinical specialist for the health care of his patients. There are still a few of the medical school courses in Canada which are heavily oriented toward the specialty of public health. Licensing examinations of the Medical Council of Canada, and more particularly the oral examinations still over-emphasize this specialty. However, the trend is to reduce the emphasis on community medicine or public health in most medical schools, because this is a specialty and requires post-graduate training.

Nevertheless, the fact that this trend has not gone far enough is revealed by the fact that all 12 of the schools have an association with the municipal or provincial department of public health, but only eight have a formal contact with clinical departments of their own medical schools, and many of these are limited to only one department. The two medical schools located at universities where there is also a School of Hygiene place a heavier emphasis on community health services and public health administration than most of the others. These two schools and two other departments of preventive medicine indicated that they had no integration of their programme with those of other clinical departments. Two of the undergraduate departments of preventive medicine indicated that they were closely linked with the department of public health in the area and that the course was composed chiefly of traditional lectures on public health and field trips to public health departments, with laboratory courses in bacteriology and parisitology

also receiving major emphasis. These departments are obviously concerned primarily with giving a practitioner a rather detailed knowledge of the specialty of public health, but have relatively little concern for the area of prevention which is the responsibility of the practising clinician.

The teacher in the medical school should present the student with information on public health in sufficiently broad outline that he may be able to decide intelligently whether he might like to specialize in that field after graduation. He should acquire an adequate knowledge of the clinical and laboratory consultation services, hospital services, etc., provided by the department of health, or voluntary community agencies, of which the future clinical practitioner may take advantage for the benefit of his patient. He should obtain a detailed knowledge of those few aspects of public health which are assigned by law as the responsibility of the practising physician. However, the primary purpose of the very brief course in public health should be a broad understanding of the aims and ideals of the public health specialist and of his relation to the general practitioner and to the community, in in order that the future practitioner may give the same degree of sympathetic support and co-operation that he is expected ethically to give to his confrères in other fields of medicine.

Just as clinical teachers in medicine, paediatrics, etc., place different emphasis on the three main areas of personal health services, preventive, diagnostic and rehabilitative, in like manner the teacher of preventive medicine may give varying emphasis to community or public health practice, to social medicine and to the personal health services performed by the practising physician. The differences of viewpoint are indicated by the titles of the departments in Canadian medical schools and also by the differences in curriculum. Nevertheless, if the future practitioner in clinical medicine, whether in general practice or in a specialty, is to be adequately qualified to become a health advisor to his patients and their families, it must be concluded that *preventive medicine* will continue to hold the paramount position among the varied roles, with social medicine and public health in subsidiary positions.

It has been suggested, however, that clinical preventive medicine can be adequately taught without a separate department. Dr. Perrin Long, when Professor of preventive medicine at the Johns Hopkins University School of Medicine in the 1940's, expressed the view that the aim of a department of preventive medicine "should be one of gradual self-extinction. Its success should be considered complete when, due to its efforts and endeavours, the level of instruction and practice of humanistic medicine has been raised to a point in all departments in a medical school, that the continued existence of a department of preventive medicine is not necessary." While this should be the eventual goal of a department of preventive medicine in a Canadian medical school, it must be recognized that this stage has not yet been reached or even approximated. With the growing complexity of clinical medicine, particularly in diagnosis and treatment, it is likely that a department with a special interest in prevention must be continued in order to ensure that the necessary balance is maintained between clinical diagnosis and treatment on the one hand and preventive medicine and rehabilitation on the other. This department

also has certain areas of teaching which are not likely to be covered by other scientific or clinical departments, including the principles of the basic sciences of epidemiology and biostatistics upon which measurement of the health status of a community is judged; the importance and relevance of social, environmental and psychological factors in health and disease; and the community health services provided by government and voluntary agencies.

It would appear, therefore, that the chief and unique function of a department of preventive medicine is to focus the attention of the undergraduate student on the promotion of health and the prevention of disease. This can best be taught in close association with the clinical teaching of diagnosis and treatment on the specific patient. The importance of the social and environmental factors which influence health and disease should not be taught separately, but in direct relation to a group of patients in the hospital and out-patient department and of healthy persons whose total health care is under the supervision of the teaching staff. The department of preventive medicine must therefore serve as a co-ordinating agency among other clinical departments. In some the preventive aspects will be adequately taken care of. If other departments pay only lip service to preventive medicine and devote their teaching wholly to the diagnosis and treatment of illness, the department of preventive medicine may have to teach those aspects in which the clinical subjects are deficient. If a clinical department devotes an adequate part of its teaching time to prevention, the department of preventive medicine should not repeat this teaching. The goal should be a gradual reduction in the time devoted to specific programmes in the department of preventive medicine and the assumption of a greater portion of the teaching by the clinical departments. Nevertheless a small department of preventive medicine will still be required to serve as a "watch dog" in order to ensure that the promotion of health and prevention of disease does not become swamped by the enthusiastic diagnostician whose major or only interest is the diagnosis and treatment of disease.

SUMMARY

Most medical graduates enter a field of clinical practice either as general practitioners or specialists. Only a few become research scientists or teachers. Clinical practice is concerned with three types of personal health services:

1. Those designed for the promotion of health and the prevention of disease.
2. Those required for the diagnosis and treatment of disease or injury.
3. Those directed toward the rehabilitation of the convalescent patient.

The undergraduate medical curriculum should give adequate attention to the education of a student in all three areas. At the present time most Canadian medical schools concentrate heavily upon the second phase, diagnosis and treatment. More emphasis is required in preventive or social medicine and in rehabilitation.

To ensure that adequate emphasis is given to the promotion of health and the prevention of disease, it is essential that there be a separate department responsible for this part of the curriculum. It may be called a department of preventive medicine, social medicine or public health, or any combination of these terms, the name depending in large measure upon the relative emphasis on these three areas. The other clinical departments must also contribute to the teaching of preventive medicine, but a separate department is still necessary to coordinate this teaching, or to supplement it where necessary.

POST-GRADUATE EDUCATION IN PUBLIC HEALTH

Public health encompasses those activities for the prevention of disease and the promotion of health which are accepted as the responsibility of the community or at least of a group within a community. It includes as well the provision of certain essential community facilities for aid in the diagnosis and treatment of disease and the rehabilitation of the convalescent or disabled. Certain public health services, such as the provision of pure water supply, pure food supply, sewage disposal, etc., can only be provided in an urban community through group effort, usually under government administration. The individual citizen cannot in practice meet his own needs. Certain other programmes may or may not be recognized as public health services, depending upon the degree of responsibility which the community has accepted. For the most part in Canada the provision of hospital facilities and diagnostic laboratories is today recognized as being a public responsibility. However, there is some variation from one province to another in the extent of community or governmental support for mental health, dental services, etc.,

Such public or community health services, whether under voluntary agencies or government, are ordinarily under the direction of a medical doctor who is a public health specialist. Other professional personnel, including nurses, sanitary inspectors and others are also engaged by the community for various aspects of the public health programme usually working under the medical specialist's direction.

The physician who is planning to enter the specialty of public health requires additional post-graduate training. Part of this training is obtained in a school of public health or hygiene. In Canada there are two such schools, the School of Hygiene of the University of Toronto and École d'Hygiène of the Université de Montréal. The training of physicians for the specialty of public health is the main function of these schools of hygiene, but both also have training programmes for other health personnel. Public health training is given not only to physicians but to dentists, engineers, veterinarians, health educators, medical administrators, including hospital administrators, statisticians and in some instances sanitarians. Other universities in Canada have schools of nursing which train public health nurses, but almost all of the other professional groups in public health are trained in the two Schools of Hygiene, except sanitary inspectors (sanitarians) who may be trained by an apprenticeship on the job.

The basic educational programme of the Canadian Schools of Hygiene is the course leading to the Diploma in Public Health of one academic year. They also provide graduate education in the science departments leading to a master's degree or doctorate, and a number of other diploma courses are given for nonmedical personnel. In the United States the pattern is similar, but most universities grant the degree of Master of Public Health instead of the diploma. Some universities also grant a higher degree, that of Doctor of Public Health.

There has been considerable change in emphasis over the years, but the curriculum of the schools of hygiene has for the most part consisted of the following major courses or groups of courses: (1) the three basic sciences of biostatistics or health statistics, epidemiology and microbiology. (2) courses in the two areas of public health practice, i.e., environmental control and public health administration.

BIOSTATISTICS

Some skills in elementary statistical techniques are acquired by the post-graduate student, who learns how to assemble statistical information with which to measure the health level of a community or to determine the progress achieved by a programme of public health. The interpretation of data, the calculation of rates and ratios, and the concepts of variability, correlation and sampling are presented. He learns methods of presenting data in charts, diagrams, graphs or tables for use in public health education as well as in scientific studies.

EPIDEMIOLOGY

Epidemiology is a study correlating statistical with clinical, laboratory and social data in an effort to determine how and why certain biological environments affect the incidence and prevalence of disease. The research application of these methods is investigated by studying the natural history of disease and disability in various populations, and the practical use of epidemiological knowledge in the investigation and control of acute epidemics is studied. Epidemiological methods are no longer limited only to communicable diseases, but apply also to any disease and indeed to the health services as well, e.g., the study of accidents, psychoses and other mental health problems, the effectiveness of immunization and other preventive procedures, the effectiveness of various administrative techniques in public health, the motivation of the public, the effectiveness of health education, etc.

MICROBIOLOGY, IMMUNOLOGY AND VIROLOGY

Microbiology, immunology and virology are taught with a special emphasis on prevention rather than pathology. Most medical students at the undergraduate level have had more background in microbiology than in the other two basic sciences of biostatistics and epidemiology, but the school of hygiene must supplement the courses from a public health standpoint.

ENVIRONMENTAL CONTROL

Under this heading the post-graduate student covers in greater detail the community aspects of various subjects which have been touched upon by the undergraduate medical student, such as applied physiology (in relation to heat, light, atmospheric conditions, etc,); water supply; sewage and waste disposal; food sanitation; rodent and vector control; air hygiene; housing; the principles of town planning; accident prevention; occupational health; radiation protection; biochemistry in relation to nutrition,etc.

PUBLIC HEALTH ADMINISTRATION

Under public health administration the post-graduate student obtains an orientation toward public health, its evolution and philosophy; public administration; budgeting and finance; methodology in medical administration and economics; planning and evaluation of programmes; the public health laws of the province and country; the role of various disciplines on the health team, including the selection, training and supervision of auxiliaries; and the major public health problems and organizations to meet them, such as the services for communicable disease control (including venereal disease and tuberculosis), maternal and child health, mental health, public health laboratory services, etc.

It should be clear from the above outline that it is necessary for the post-graduate student to have at least a full academic year to enlarge his basic knowledge in the five main areas mentioned above. Lectures, laboratories, seminar discussions, and library reading comprise the chief methods by which the graduate student extends his knowledge during this year. It should also be obvious that this basic year of education does not provide the practical experience which is as necessary in this specialty as it is in the clinical fields. Therein lies the major difference between the training of the public health specialist and the specialist in most other clinical and laboratory branches of medicine. The post-graduate student in the latter fields obtains his practical experience as an intern or resident in an approved hospital or in the laboratory or x-ray department of such a hospital. Reading, seminar discussions, and other methods of organized teaching play a subsidiary role and are integrated closely with the day-to-day practical experience obtained at the bedside or in the laboratory. In comparison the Diploma in Public Health course is more sharply divorced from both clinical and public health practice.

Most physicians entering public health have been in private practice or hospital work and have often had extensive experience, but many of them have had relatively little supervised clinical training except the rotating internship. It is obvious that public health officers must work very closely with the general practitioners and clinical specialists of their district. The community health programmes, which are the primary responsibility of the public health officer, cannot be effectively carried out unless good programmes of preventive medicine are being practised by the clinicians as well. In order to achieve the close collaboration which is essential, the public health officer must have special qualifications and be recognized by the general practitioner as having such qualifications. The medical

officer of health is responsible for community programmes of maternal and child health, for communicable disease control, tuberculosis control, venereal disease control, and in some instances for mental health or special community programmes for early diagnosis of chronic disease such as diabetes and cancer. It seems essential, therefore, that he should have more clinical training than the single year of internship.

The regulations of the Royal College of Physicians and Surgeons governing certification in public health allow credit for either one year of resident training in medicine, paediatrics, obstetrics and gynaecology, tuberculosis or psychiatry, or a year divided between any two of these fields; or, in lieu of this clinical training, one additional year in one of the basic sciences related to public health, e.g., bacteriology, biostatistics or epidemiology. The specialist in a teaching centre should probably be trained in the latter public health sciences, but most of the practising health officers should have the additional year of training as a senior intern or resident in a branch of clinical medicine relating to public health.

It has been stated that the school of hygiene must be kept separate from the faculty of medicine because many other members of the "health team" are also trained in the school, as well as those with a medical background. It is accepted that the post-graduate programme of these schools of hygiene should be separated from the undergraduate medical courses. The goal of the school is different and the courses are more specialized and more advanced than those of the medical faculty. It is not clear, however, that this branch of post-graduate medical education should be divorced from the other post-graduate programmes in the teaching hospitals. Non-medical personnel are trained in such hospitals with the medical specialist. Each gains from association with the other members of the health team, nurses, medical social workers, physiotherapists, etc. But perhaps even more important, the post-graduate students in medicine, surgery, pathology, etc., learn from each other.

The public health specialist trained in a school of hygiene has inadequate association with the post-graduate students in other specialties. Yet he is required, more than any other, to be the co-ordinator of the health services and, therefore, must work closely in later life with all of the other specialists and general practitioners. The clinical experience for a man planning to go into public health should be heavily weighted in the direction of well-baby care in paediatrics rather than the diagnosis and care of patients in the paediatric wards. Similarly, in other areas of medicine and obstetrics, the preventive programme would receive major consideration. Departments of medicine, surgery, obstetrics, paediatrics and psychiatry frequently have research studies which touch upon the epidemiology of a disease or group of diseases. Collaboration with the public health specialists would be mutually beneficial. The inadequate and often ill-organized programmes for the control of staphylococcal and other infections in hospitals is an example of area in which collaboration would be mutually beneficial. In other words, the clinical specialists trained in hospitals have been divorced from public health programmes and have not learned many of the useful techniques, particularly biostatistics and epidemiology, which would be useful to them. On the other hand,

the public health specialists have been almost completely divorced from the hospitals, although they are required to devote their attention in future to the organization of community programmes which require considerable specialized knowledge in medicine, obstetrics, psychiatry or paediatrics, or in hospital organization.

One area of clinical experience for which no credit is now given by the Royal College regulations is that of general practice. It is considered mandatory that a public health officer should have had experience in general practice before he takes a Diploma in Public Health. If a system is developed by which general practice training under supervision can be achieved, it is hoped that one year of credit for such supervised general practice training would be accepted toward public health certification.

It is essential that the academic year devoted to Diploma in Public Health education be continued. A tremendous fund of basic information in the five major areas already described must be understood as the basis for good health practice. However, it is suggested that consideration should be given to the integration of a year of advanced clinical training and the year of study for the Diploma in Public Health into a two-year programme. After one or two years in general practice the candidate would return to take this advanced clinical and public health course. In any event, whether the year of university training leading to the Diploma in Public Health remains as it is or is integrated with a clinical year, it should be considered comparable to the preclinical sciences and the first clinical year of the undergraduate medical course. Just as the undergraduate course must be followed by the apprentice training of a clinical clerkship and internship, so should the public health training include a year of supervised experience under a qualified instructor in a public health unit or units which have a broad general programme. The establishment of field training units has been recommended by the Canadian Public Health Association and the Royal College of Physicians and Surgeons since certification in public health was first approved. In the past some candidates have been admitted to the certification examinations whose only public health practice following the Diploma in Public Health had been solo practice as the health officer in a remote unit. A small degree of supervision had been maintained by the provincial department of health, but this cannot be considered as an adequate substitute for close day-to-day instruction and supervision during the first year of public health practice. Such unsupervised experience is no longer accepted by the College. If public health is to be raised to the level of other specialties, these field training units must be established, preferably one in each province, or at least in sufficient numbers that all D. P. H. graduates may have a year of supervised training immediately following the award of the diploma. It is suggested that these field training units should be affiliated with the department of preventive medicine of the nearest medical school or with the Schools of Hygiene at Toronto and Montreal.

Such a public health residency programme would be similar to those approved by the Council on Education and Training of the American College of Preventive Medicine. The essentials would be a well-staffed public health unit with a broad general programme under the direction of an experienced specialist with the

interest, aptitude, ability and time to train new graduates holding a Diploma in Public Health. In the USA it is estimated that one-tenth to one-fifth of the director's time should be devoted to supervision and teaching, but the resident in training makes compensatory contributions in service to the unit.

At the present time there are actually two standards for qualification in public health. One is the Diploma in Public Health alone with practice in public health as an independent public health officer beginning immediately thereafter. The other is the present Royal College certification. It is considered that the present Diploma in Public Health course in itself is inadequate to qualify a person for practice in public health without the year of supervised field training. This year plus a preliminary experience in general practice should provide the basic requirements for the specialty.

It is suggested that the Royal College of Physicians and Surgeons of Canada should modify the training requirements for certification in public health and also develop a fellowship programme. For certification, it is proposed that the minimum requirement be a year of rotating internship, one or more years in supervised general practice (accredited as equivalent to one year of training), a Diploma in Public Health, a year of field training in an approved residency training programme in public health, and (*except* for a candidate who had one additional year of clinical training in medicine, obstetrics, paediatrics or psychiatry before the Diploma in Public Health) one additional year of public health practice following the year of supervised field training. He would be admitted to the certification examination immediately following the year of supervised field training in public health. Such a clinical year should preferably be integrated with the Diploma in Public Health.

It is suggested that the fellowship requirement include supervised general practice, Diploma in Public Health, a year of supervised public health training as in the case of certification, but a year of residency training in internal medicine, paediatrics, obstetrics or psychiatry preceding the Diploma in Public Health would be mandatory and an additional year of public health training or practice in (1) biostatistics, bacteriology, virology, epidemiology, or sociology; (2) a specialized public health unit such as tuberculosis control, mental health, industrial health; (3) in hospital administration, public health administration or medical care; (4) research in any area of public health practice or in a basic science related to public health.

A major criticism of the present public health training is that it is not a planned programme. A graduate proceeding to specialized training in one of the clinical or laboratory fields of medicine will ordinarily consult one or more specialists in the field, usually at a teaching centre. He will plan a complete four-year programme in which increasing knowledge and increasing assumption of responsibility will proceed in orderly sequence. The physician who is entering public health as a specialty will usually do so by accepting an appointment for a trial period with a department of public health and will then take a Diploma in Public Health. Relatively little planning of the whole programme of training leading to complete qualification as a specialist has taken place. Usually he proceeds

directly into public health practice after the Diploma in Public Health and never does qualify as a fully trained specialist. It is suggested that the directors of the field training unit in each province (when established), the departments of preventive medicine or the schools of hygiene, in consultation with the clinical specialists in medicine, paediatrics, obstetrics and psychiatry, arrange for a four-year programme, as in the case of most of the other clinical specialties. In other words, both the clinical programme and the field programmes would be more carefully tailored to the needs of the public health specialist. It is believed that this would result in advantages to the clinical training units as well, since, as previously noted, many of the specialists in the clinical departments do not have adequate contact with or opportunity for experience in preventive programmes. Their association with residents who had a special interest in these fields would be mutually advantageous.

Finally, to ensure a more effective post-graduate training programme in public health and the effective development of public health practice in Canada, the present schism between the public health specialists and practising clinicians must be healed. Several briefs presented to the Royal Commission by public health specialists have been critical of lack of interest on the part of practising clinicians in the programmes of community health and lack of, or inadequate practice of, personal preventive medicine by these physicians. There is little doubt that most of these criticisms are valid, but it is equally true, and has not been so clearly stated, that the schools of hygiene have made little effort to train public health officers to become close collaborators of the practising physicians in their communities rather than their critics. The public health officer, more than perhaps any other specialist, requires a sound knowledge of good public relations with respect to his own *confrères* in the profession as well as with the public. The suggestion by some public health officials and public health educators that general medical practice should be placed under the direction of public health departments can only serve to widen the breach between clinical practitioners on the one hand and public health specialists on the other. The public health specialist is not either by training or interest qualified to supervise general practice in any way. There is a great need for mutual understanding fostered on the one hand at the undergraduate medical school and teaching hospital in order to influence the future clinical practitioners, but also fostered at the schools of hygiene in a manner which has not been obvious in the past.

SUMMARY

Public Health is a specialty of medicine which requires additional training following graduation. At least one year of study is required in a school of hygiene which has a staff qualified to give the necessary courses in the three basic sciences of biostatistics, epidemiology and public health microbiology and in the two areas of public health practice, i.e., environmental control and public health administration. The departments of preventive medicine of Canadian medical schools do not have staff with adequate training in all of these areas to provide

this specialty training, and it is, therefore, centralized in two Schools of Hygiene at the University of Toronto and the University of Montreal.

Before entering the Diploma in Public Health course at such a School of Hygiene, the candidate should have experience in general practice and preferably also have one year of advanced clinical training in an area of internal medicine, paediatrics, obstetrics, or psychiatry related to public health. Present training programmes in Canada are deficient in such advanced clinical training and even when available it often gives inadequate emphasis to preventive medicine.

Following the Diploma in Public Health, the public health specialist should have a year of supervised field training in a public health residency. This should be in a well-staffed public health unit with a broad general programme under the direction of an experienced specialist with the interest, aptitude, ability and time to train newly graduated holders of a Diploma in Public Health.

Hospital administrators and the administrators of hospital and medical insurance programmes also require specialized training. A part of this is similar to the training of the public health specialist and the three programmes of specialty and training should be interrelated. However, the present Diploma in Public Health course alone is not an effective experience for an administrator of a hospital, or of a hospital or medical insurance plan. Field training units in hospital administration and in medical or hospital insurance administration should be set up comparable to the public health field training units.

A closer integration of the clinical training of these three specialties with the training of other specialists in the clinical fields is desirable, but the basic courses in biostatistics, epidemiology, administrative practices, personnel policies, etc., must be organized in a few centres where specialized teachers are available, i.e., schools of hygiene.

APPENDIX 4

D.V.A. HOSPITALS AND THEIR RELATION TO MEDICAL EDUCATION

A federal system of hospitals for the treatment of veterans was established because of the Government of Canada recognizing its responsibility for veterans' care, particularly for those who suffered injury or permanent disability from illness, during service to their country in World War I. This responsibility was widened during the depression years of 1928-1934 to allow for certain welfare measures for any citizen who had served a minimum of 12 months overseas, so that such citizens would receive certain cash benefits in the event of unemployment or unemployability – the so-called "burnt-out pension". Following World War II, the facilities of the veterans' hospitals were extended. Several new hospitals were built, others were reconditioned and modernized. In 1946, Dr. Warner, director of treatment services, established the principle that whenever such hospitals were in the neighbourhood of a university, the local medical school was invited to assist in the staffing of the hospitals, and that the patients, the laboratories and the other facilities would be available for undergraduate and post-graduate teaching. Dr. Warner affirmed that the quality of treatment of the veterans could be maintained only in hospitals which were active in teaching and research. His statesmanlike action as a senior civil servant has been amply justified in the record of these hospitals during the last 18 years, as first-class centres of both medical care and post-graduate education of specialists.

In 1948, when the main problem of rehabilitation of those who suffered from service-connected disabilities had been solved, a regulation of the Department gave entitlement for treatment for any disease or disability to the War Veterans' Allowance recipients. This resulted in a considerable increase in the number of patients in the hospitals, and added to the value of the hospitals as suitable institutions for teaching, post-graduate training, and research.

As the years pass, it is inevitable that in these institutions there should be increasing numbers of patients who suffer from chronic disease, or who are in need of special attention for the degenerative conditions of the aged. Nevertheless, in some areas the acute treatment beds in these modern institutions are only partly occupied while long waiting lists have been a feature of the civilian hospitals in the community.

If a veteran is admitted for care to a general or special civilian hospital, the Department of Veterans Affairs pays the premium for hospital insurance to the appropriate provincial hospital services commission, and arranges for free medical care.

The Report of the Royal Commission on Government Organization, Volume 3, contains some important observations on the federal government's activities in the hospital field, and recommends that the Government should gradually divest itself of the responsibility for the operation of a chain of hospitals where now only 12 to 15 per cent of well-equipped acute treatment beds are occupied by veterans with service-connected disease or disability. A very large percentage of the beds are occupied by veterans on War Veterans' Allowance, which includes, as an associated benefit, treatment in hospital for any illness or injury.

Various other special categories afford entitlement for admission to the veterans' hospitals, but now that we have good hospital insurance schemes, and the likelihood of general medical care insurance, there would seem to be little reason for the Federal Government to continue to be so heavily involved in the operation of large general hospitals.

This has some relevance to the maintenance of teaching facilities that have been of the greatest value to Canadian medical schools in the past 18 years, and to plans for expanding these facilities in the next 18 years. Elsewhere in our study we have indicated the need for liberal Federal support in the building of new teaching hospitals and laboratories. But the directors of an existing hospital cannot be excused for keeping a large proportion of its beds empty of patients, when, if it is in the area served by a medical school, it might be offered to the university for operation on a full occupancy basis, in the interest of its teaching programme.

If such a transfer were made, it would be clearly understood that the immediate responsibility of the Department of Veterans Affairs for service-connected disabilities must be recognized and that acute treatment for such disabilities must have priority in admission to the newly organized university hospital. The department's increasing responsibility in chronic care and the management of geriatric problems will be paramount. In a hospital such as Sunnybrook, 700 to 800 beds could be made available as a first-class university teaching unit, open to the civilians in the community; the remainder of the beds could be devoted to chronic and geriatric care, and might rapidly become a demonstration and research unit in which the health problems of a rapidly increasing section of Canadian citizenry could be examined. Sunnybrook is fortunate in having extensive grounds and new units could be built at moderate cost to accommodate this particular type of patient gradually freeing more of the excellent facilities in the main building for other admissions.

The hospital at St. Foy is much smaller, but it is modern and of first-class construction. It would lend itself very well to university teaching as a General Hospital. It is appreciated that the medical school in Laval has plans for a university-owned and operated hospital, but the acquisition of a relatively small unit

such as St. Foy should not impede the ultimate plans for a hospital on the campus. It would be an excellent immediate supplement to the existing facilities, would give the university the experience of operating a hospital, and would fit very well into the final plans for clinical teaching in this school, which qualifies approximately 100 new doctors each year.

With the experience of such developments in these two communities, further thought could be given to the use of other D.V.A. centres. We believe firmly that the acute treatment function of these D.V.A. hospitals should be turned over to some local authority – wherever possible to be used as a teaching facility – while the Department should proceed to develop its full capabilities in the chronic care and geriatric field, maintaining, of course, a close association with the medical schools in the area.

CONCLUSIONS

In the light of the observations in Volume 3 of the Report of the Royal Commission on Government Organization, and after careful study by our own group,

> We strongly recommend that joint study groups of university and D.V.A. personnel be established in the City of Quebec and in Toronto to consider the taking over by universities of the operation of the D.V.A. Hospital of St. Foy in Quebec City and of a suitable part of Sunnybrook Hospital in Toronto.

APPENDIX 5

REPORTS ON POST-GRADUATE MEDICAL EDUCATION

DIVISION OF POST-GRADUATE MEDICAL EDUCATION
FACULTY OF MEDICINE, UNIVERSITY OF TORONTO
ANNUAL REPORT OF THE DIRECTOR, 1961–62

Medical Education in Canada is now in one of those healthy periods of re-appraisal which, on former occasions have led to general understanding and agreement about problems to be faced, stimulated the fixing of new objectives and made possible a rise in the level of professional education. These reviews are necessary if medicine is to keep abreast of the times.

It is widely recognized that advances in science, a widening understanding of disease and a vastly increased capacity both to preserve health and treat disease have added to the responsibilities of medicine. Unlike professions not concerned directly and urgently with human life and health medicine must quickly incorporate the steadily accumulating advances into its teaching and everyday practice. If we are to be successful in this ideal of promoting and maintaining high standards of medical care all phases of medical education must adapt to present day needs and opportunities.

The first responsibility of medical schools must continue to be undergraduate education and research; but this is not enough, and medical educators, the universities and governments will find it increasingly necessary to direct thought and devote resources and money to the graduate and post-graduate phases of medical education.

Medical faculties in Canada have a responsibility both to the public and to the medical profession to provide graduate training immediately, or soon after, completion of the undergraduate course and to offer doctors in practice the opportunity for post-graduate training at intermittent intervals. These two important phases of medical education are closely associated, for they can make use of the same teaching staff and can function efficiently under one administrative and financial plan.

The object of this report is to discuss the experience of the Faculty of Medicine of the University of Toronto in the increasingly important graduate and post-graduate phases of medical education.

This Faculty has recognized that the undergraduate course should prepare men for practice by equipping them with a basic store of knowledge and experience and by instilling in them an attitude of mind which will make them life-long students. There has followed an interest in providing the opportunities required to help doctors continue their education. Successive Post-graduate Committees of the Faculty have surveyed the needs of our graduates and of the medical community generally, assessed the facilities available to meet these needs and, after insuring that there was no encroachment on the accepted primary responsibilities for undergraduate training and research, have organized constantly broadening graduate and post-graduate programmes. In the period before the founding of the Royal College of Physicians and Surgeons of Canada it was unusual for a graduate to spend more than a few years in internship and residency in Canada. A good proportion of advanced graduate and post-graduate training was of necessity sought abroad. During these years when there was relatively little graduate instruction organized by University Medical Schools, this Faculty co-operated with different Medical Societies – local, provincial and national – in providing staff and speakers for professional meetings. A few short post-graduate courses for practising doctors were offered at intermittent intervals.

When the Royal College of Physicians and Surgeons of Canada set up standards for training (before World War II) an interest in the Fellowship developed and this, along with advances in medicine, resulted in an increase in the number of training positions at the senior intern and resident level in Toronto as well as all across the country. Along with this there was a modest increase in the number of short post-graduate courses for doctors in practice. A new era set in at the close of World War II. Indeed the Minutes of our Post-graduate Committee indicate that in 1944 elaborate plans were discussed for providing refresher courses for the large number of doctors whose post-graduate education and training had been interrupted by long service with the armed forces. After the War the need for facilities for specialist training increased very sharply. This was contributed to by a number of factors including a growing interest in the fellowship of the Royal College and in its certification programme together with a demand by the public for the specialist care made possible by advances in knowledge. The interest continues to grow. In the early post War years the Faculty received more and more requests for short post-graduate courses and special lectures both in Toronto and extra-mural. To meet the challenge and to insure that all its responsibilities be discharged efficiently, the Faculty of Medicine decided to expand the activities of the Post-graduate Committee. The Chairman became a part time university appointee as Director of Post-graduate Studies with responsibility for assessing the needs for and to develop organized training programmes for those doctors wishing to gain additional experience and qualifications to fit them for either general or special practice, to co-operate with different departments of the faculty in their graduate programmes and to arrange

special courses for practitioners. An important additional responsibility was to keep under review the needs of the profession and to meet them in so far as the facilities of the Faculty could do so. Dr. R.C. Dickson was appointed in 1950 as the first Director of Post-graduate Studies and during the next five years a marked growth in the graduate and post-graduate work of the Faculty took place. A special senior internship designed to train men for general practice had already been arranged and it was continued and improved, a lecture series for interns registered as post-graduate students was organized, the Faculty co-operated with the University of Toronto Medical Alumni in offering a yearly post-graduate course, and the advanced graduate courses in medicine, surgery and obstetrics and gynaecology, which had been offered yearly from 1946, were continued and improved. Short post-graduate courses for doctors in practice, both general and special, were organized. Perhaps the most significant of all developments was the institution of Travelling Clinics in 1951. This was made possible by a grant from the Kellogg Foundation which was extended to 1956, after which financial support came, for a short time, from some of the medical societies visited by our teaching teams and subsequently from a special Government grant and by grants from the Ontario Heart Foundation. The latter grants were available whenever the teaching clinics in the outlying centres were devoted entirely to problems in cardiovascular disease. These travelling clinics were planned in the belief that the most effective post-graduate experience is through the medium of clinics where both teacher and students take an active part in examining a patient and in discussing the different problems presented not only by this patient but by others with similar symptoms, signs and course. These clinics have involved close collaboration between local medical societies and the university. The selection and presentation of cases for examination and discussion is done at the local level and the clinics have been held in a central hospital in the area visited with the day and the place being determined by the convenience of the practitioners in the area. It has been the experience of our faculty that these teaching clinics have been successful and that benefits have come not only to members of the local society and their patients but the university teachers as well.

By the time Dr. R.C. Dickson had resigned to assume the Chair of Medicine at Dalhousie University on the 1st of January, 1956, the work of his Department had increased sufficiently to require the services of a half-time secretary. At that date, the post-graduate activities of the faculty became the responsibility of a newly created Division of Post-graduate Medical Education which had a part-time Director and a half-time Secretary. The terms of reference were similar to those which had been established when Dr. Dickson became Director of Post-graduate Studies in 1950. The policies and activities of the Division are regulated by the Post-graduate Committee of the Faculty composed of heads of departments or their representatives; and reports are made to the Faculty Council at each of its meetings. The work of the division continued to expand and the need for secretarial help increased first to full-time and, in 1961, to additional part-time secretarial help amounting to one-third and occasionally to one-half time.

A useful contribution to both graduate and post-graduate medical education, made easier because of the organization of the division has been made by distinguished visitors from abroad. It has been possible to take advantage of their presence on this continent and to bring them to Toronto to visit and teach in different departments. Usually these visits have been of short duration; but the exchange arrangement between the Faculty of Medicine of the University of Toronto and the Middlesex Hospital Medical School has brought a senior teacher from that school for a month each year since 1956 and different members of our staff have gone each year since 1955 to work for a month at the Middlesex Hospital in London, England.

On the basis of experience over the past six years in which there has been a continuing increase in the demand for graduate and post-graduate training as well as a continuing expansion of the facilities provided for it by the faculty and different departments of this school, one can predict that there will be growing demands in the future especially if a plan of national health insurance is introduced. If medical faculties are expected to assume increased responsibilities care will have to be taken to insure that a proper balance be maintained between undergraduate, graduate and post-graduate medical education and research. The purposes of post-graduate medical education must be kept in mind: the facilities and organization necessary for its efficient performance and development require careful thought and planning. The major part which the university medical schools must of necessity take in it should be recognized both by the universities and the profession generally and there must be understanding about the need for sound financing and continuity of effort.

The purpose of post-graduate medical education is to keep the doctor in practice up-to-date and to extend his training by providing him with opportunities for acquiring new knowledge and techniques applicable to his own field of practice. This form of education differs from undergraduate and graduate medical education. The needs of the students are different, the students themselves vary in experience and motivation, the techniques of teaching are not necessarily the same and the periods of formal instruction must be short and repeated rather than continuous. The post-graduate student of medicine is usually mature, he has had the opportunity of applying and testing in practice his basic knowledge and accumulated experience, and his judgments about this knowledge and the art of applying it effectively should be more acute than is the case with the undergraduate or graduate student. Furthermore the doctor in practice is extending his education not necessarily to secure a degree or a diploma or to obtain prestige or financial advantage. He takes time away from his practice for study because he realizes that he is responsible for the health and lives of his patients and must keep himself abreast of the times. It is often difficult for the doctor-student to leave his practice and therefore the time he spends on post-graduate study must be recognized as valuable and the content of courses arranged for him must be of the highest quality and applicable to his special needs. Programmes should conform to the wide variations in professional interest and responsibility and the experience of this school has been that formal courses should not attempt to

cover too wide a field at one time. The teachers in these courses require special experience, skills and attitudes, and they must be aware that the methods useful in undergraduate teaching are not necessarily equally valuable in the post-graduate field. A teacher must have had enough experience in his own field to speak authoritatively, and he should be aware of the professional problems and backgrounds of his audience in order to avoid wasting time in unnecessary repetition and so diminishing the time which should be devoted to discussing recent advances and co-ordinating them with the experience of his audience. Mutual respect and consideration between the post-graduate teacher and the doctor-student would insure that each makes the best use of the other's time. Ideally, courses should be scheduled to suit the time of the doctor-students and at periods when the teaching group are free to deal effectively with the load and have proper access to adequate lecture room space and other amenities.

It is a vexed problem as to who should be responsible for conducting or sponsoring programmes in post-graduate medical education. Simply having the wish to arrange post-graduate programmes is not enough to ensure that the time of teachers and students will be put to the best use. To be successful this important phase of education requires an organization with educational resources, a sound administration capable of providing a continuity of effort and direction, a staff sufficiently large and experienced in medicine and in teaching to make and carry out long term plans, and proper financial support to allow for healthy expansion. It is fair to state that the medical schools not only offer the majority of the formal courses even now but they also contribute largely to courses organized by medical societies and other organizations. This is natural, for the universities have given the preliminary phases of the doctor's education, their staffs are engaged in investigation and research and they have the resources required to ensure continuity of effort for the graduate and postgraduate phases. These resources include experienced teachers in the sciences as well as in the clinical fields together with the variety of clinical material so necessary to the success of many post-graduate programmes. They also have the physical assets such as lecture theatres and clinical conference rooms, teaching areas and other amenities which are so helpful in any teaching programme. Recognizing their responsibility to provide post-graduate opportunities for their own graduates as well as for the profession generally, and realizing that undergraduate education and research might be weakened by unorganized and haphazard graduate and post-graduate programmes, many schools in the United States and some in Canada have organized post-graduate divisions or departments within the undergraduate school and under the direction of their faculty councils as is the case in the University of Toronto. This seems to be an efficient arrangement for Toronto at least for it avoids unreasonable competition for teachers and money and ideally permits the important responsibilities to undergraduate education and research to proceed without competition from a too aggressive and completely independent post-graduate competitor. The post-graduate division requires the support of all departments and, in its turn, it must respect their primary responsibilities and not interfere with them through inappropriate use of their

teaching facilities in the post-graduate field. It is this over-use, and indeed some would say misuse, of teaching facilities which is one of the arguments for the establishment of post-graduate divisions or departments. This establishment would tend to protect the medical school from excessive and unco-ordinated requests to assist with programmes of medical societies and lay medical organizations which in many instances have no continuity of effort, no considered policy in the type of programmes offered and no understanding of the impossibility of arranging single programmes which satisfy the need of the entire medical community.

Strong references have been made to proper financing and organization. When the post-graduate division of this faculty was set up it was decided that it should work within a budget and that expenditures should not exceed anticipated receipts. Each year a budget is prepared with both receipts and expenditures estimated under a number of headings. The general policy is that short post-graduate courses for doctors in practice should be self-supporting but that substantial losses may be incurred in the graduate programmes for senior interns, residents and fellows. In preparing this budget one must have in mind the type and number of courses likely to be offered in the succeeding year and one must be in a position to assess the probable attendance. The post-graduate committee believes that it is essential to the success of the graduate and post-graduate programmes that the teachers be paid honoraria, for this teaching is too important to be done as an extra. It requires careful preparation and thought and unhurried time and delivery. This policy has met with the approval of participants in our courses and doctor-students now feel no embarrassment in making requests of the teaching staff. The teachers themselves have been able to take the extra time in preparation so necessary for the useful instruction of students who have had experience in practice or extended hospital training.

All the administrative and financial procedures of the division have been designed to ensure that there will be no conflict of interests within the faculty itself and no departure from established university policy. The budget of the division increased by approximately 120 per cent between 1955 and 1960 and in no year have expenditures exceeded receipts.

It seems clear that post-graduate medical education must expand and to achieve this there must be close co-operation and understanding between the universities who have the basic resources to provide the bulk of the teaching and those who wish to have the instruction. The keys to this co-operation lie with the medical schools and at branch society level of the different provincial medical society groups. With this understanding and cooperation meetings can be held at which the work load for the year ahead is assessed and co-ordinated and plans made to deal with it most efficiently. This planning does not involve interference with the university programmes of formal intra-mural courses designed to meet the special groups of practitioners but it does provide a forum where those needs can be discussed about how to deal with them best.

REPORT OF THE DIRECTOR, THE POST-GRADUATE DIVISION OF THE FACULTY OF MEDICINE – DALHOUSIE UNIVERSITY

EXTRAMURAL CONTINUING MEDICAL EDUCATION

The following presents the philosophy developed during twelve years of experience by the writer as a member of the Post-Graduate Committee and subsequently Director of the Post-Graduate Division of the Faculty of Medicine, Dalhousie. This is followed be a detailed description of the most effective segment of the present continuing medical education program at Dalhousie supported by an appendix documenting the overall program. A projection of the writer's concept of a minimum satisfactory program for the entire Atlantic area concludes this presentation.

It has been estimated that research is doubling our fund of scientific information every ten years and that the past fifty years have seen more advance in medicine than the whole preceding period in history. While the necessity of continuing medical education throughout the lifetime of practice has been reiterated for over two thousand years the pace of recent developments makes lifelong medical training for today's practising doctor a matter of vital concern to a greater degree than ever before.

It is the primary aim of the Faculty of Medicine Undergraduate School to equip the college-educated young scientist with the basic principles of medicine and with its current practices. However the above-noted circumstances alter current practices so rapidly that a doctor will become first inefficient and then within ten years after graduation grossly defective, as measured by the current standards. It is even impossible to make the student reasonably proficient in the smaller phases of medicine during a four year undergraduate course and a twelve month internship. There is a growing demand that all doctors, upon graduation from medical school, should undergo a further period of full-time training to develop their knowledge "in depth" and to perfect technical skills as a necessary extension of the undergraduate training prior to assuming responsibilities of independent practice of medicine. It is equally true that part-time or "post-graduate" study is required throughout the doctor's lifetime of practice *in all fields* of medicine. This latter field is the one increasingly referred to as "continuing medical education."

Canadian universities have, to a varying degree, recognized that both full-time graduate training and part-time lifelong post-graduate training are predominantly academic, in continuity of the undergraduate medical education which is their universally accepted and recognized major responsibility. Implementation of the university's proper role of providing all the medical education services required in the graduate and post-graduate fields has been grossly restricted through lack of finances and shortages of teachers.

Restricting our considerations to the field of continuing medical education, this takes several forms, two of which are particularly important. The most readily available to all doctors is the medical literature. The delays inherent in publishing textbooks makes them of secondary value to the practising doctor. Medical journals are of greater value but the growing volume of their publication makes it more and more difficult for the practitioner to extract all the information he requires in containing medical education from medical journals. As a result it is becoming increasingly important that the practitioner return frequently to the proven educational techniques of his full-time clinical training as a senior undergraduate student and graduate student. This requires his presence in a hospital with a patient whom he preferably examines himself or whose examination he at least hears and sees described, while the learning experience is completed by questions and discussion between the practitioner "student" and a teacher. Because of the experience developed in the field of undergraduate teaching and graduate training the university faculty member is best suited to apply these clinical teaching techniques in the field of continuing medical education. Unfortunately, university teaching hospitals, heavily committed to full-time undergraduate and graduate teaching, and necessarily removed by many miles from considerable numbers of practising doctors, cannot provide more than a small fraction of the clinical continuing medical education required by practising doctors. For example, in any one year, fewer than three hundred doctors from the four Atlantic provinces (out of a total of fifteen hundred) attend continuing medical education programs in Dalhousie University. The Dalhousie Post-Graduate Division is concentrating increasingly on sending the teacher to a community hospital. Such programs attract from 50–75 per cent of doctors practising within the sphere of service of the community hospital. This "pilot experience" leads to the belief that the solution to effective continuing medical education is to carry out most of the teaching in the practitioner "student's" home community hospital, utilizing his own patients, the teacher visiting from the university.

The extramural component of Dalhousie's Post-Graduate Division program is detailed as an illustration. Every effort is made to have the local practising doctors participate as fully as possible in planning programs to meet their own recognized needs. This has resulted in a diversity of programs, increasing both planning problems and operating expenses, which it is believed is justifiable in search of the most suitable form of program.

Four major patterns of meetings have evolved, as follows:

1. Morning three hours, afternoon three hours. This results in a small and changing audience because of practice commitments and is not particularly desirable.

2. Late afternoon two hours, evening two hours. This is especially effective on a local "half-day" when doctors' offices are closed afternoon and evening and patients are accustomed to receiving only emergency and urgent services.

3. Evening, three hours. This meeting is most readily available to all practitioners. Such a meeting is wasteful of teacher time unless the community hospital is near the university centre and teachers' travel time is minimal.
4. Evening, two hours; following morning, three hours. This is probably the most effective combination, being suitable for most practitioners and making best use of the teachers' time. It provides an adequate period of time for both formal discussion and a considerable number of case presentations.

Any one or combination of the above form of meetings can be combined into a "course" or series of meetings. The following are examples:

1. Eight monthly meetings, three in the fall and five in the spring are often requested but, because they readily become routine and less active participation results, they are discouraged.
2. Three or four weekly meetings in the fall with a repeat series in the spring usually results in a highly effective first series and a less effective second series by which time they have become "routine" events.
3. Four or preferably six weekly meetings, once annually or biennially have proven most successful. These are participated in with considerable enthusiasm as a "special event" by the local practitioners with intensive preparation and lively discussion. *A "course" consisting of six weekly evening meetings followed by morning case presentations and discussions is our most favored and successful form of continuing medical education.*

Meetings of the above type attract 50 to 75 per cent of the practising doctors resident in an area served by a community hospital. They are effective with groups of from 6 to 24 doctors, about twelve being the ideal number. They provide, depending on the format of the individual meeting, from 18 to 36 hours of learning annually. The effort and cost involved in each series of meetings is considerable, for example:

A planning meeting is held, with the Post-Graduate Division Director visiting the community hospital to meet with the local program committee, preferably two to three months before the series of meetings starts. Agreement is reached on sponsorship (usually branch medical society, local chapter College of General Practice, or community hospital staff, or some combination of these). The day for the meeting, the pattern of the meeting, the types of cases to be presented on each day so as to provide a program of broad interest, are agreed to. Local practitioners who will present cases, and visiting teachers, are tentatively named. Physical facilities for the meeting are reviewed, format of notices to practitioners and the area to be notified is decided upon. Arrangements for collecting tuition fees are worked out and the necessity for tuition fees explained. Further planning is usually done by correspondence and, upon occasion, long distance telephone.

The Post-Graduate Division Director has to fit each series into an overall program for the four Atlantic provinces so as to distribute the preparatory office work and, in particular, the teaching load over the entire academic year

as uniformly as possible while considering periods of peak commitments for teachers and seasons of difficult travel or epidemic illness that interfere with attendance.

In the academic year 1961–1962 there were eight regional courses in Nova Scotia (plus three in Halifax), two in New Brunswick and one in Prince Edward Island with an average attendance of 13 doctors at each of 79 meetings. The ratio of doctors by provinces is as 8:5:3:1 in Nova Scotia, New Brunswick, Newfoundland and Prince Edward Island. It is our ultimate aim to provide regional courses in this same proportion in the four provinces.

Each course involves the Director in considerable correspondence and telephoning after the planning meeting, in contacting teachers, describing course details and confirming arrangements. In addition, the Post-Graduate Division secretary makes travel arrangements, arranges for transportation of the necessary audio-visual aids, sends course notices to all concerned and weekly reminders to actual registrants. She distributes travel expenses and meeting report forms and these latter are vetted by the Director upon their receipt from the teachers in order to utilize criticisms and suggestions in the improvement of subsequent meetings.

Each meeting involves a teacher after preparation of his material, in twenty-four to forty-eight hours away from all other duties while his work in the University is carried out as an extra duty by others. The local community Program Chairman spends considerable time ensuring that case presentations will be available, in keeping attendance and collecting fees. One or two local practitioners experience the particularly valuable training of preparing a case for presentation at each meeting.

In addition to the above expenditures of time and effort financial outlays include per meeting:

Teacher's honorarium	$ 50.00
Teacher's expenses	75.00
Prorated organization expenses;	
Directors planning visit	20.00
Subsequent correspondence, etc.	5.00
Secretarial time	8.00
Stationery, postage, etc.	2.00
Total	$160.00

(If the meeting is over 200 miles from Halifax total expenses increase per meeting from $160 to $200).

Cost of a six meeting course therefore is $960 to $1,200.

Income is from three major sources:

Tuition income averages $50 per meeting ($300 per course). *The fact that these tuition fees are not an allowable income tax expense against the doctor's practice is the source of much ill feeling* and in some instances has resulted in a group cancelling arrangements for a course.

The provincial medical societies, by a system of membership levies, contribute the equivalent of $10 per meeting or $60 per course.

The remaining expenses, varying from $100 to $140 per meeting ($600 to $840 per course) must be met from other grants to the University specifically for continuing medical education. These grants have, in effect, made the present program possible but none of the present sources of income can be expected to increase significantly to allow of necessary expansion. The major source of funds over the past twelve years has been an annual grant from the W.K. Kellogg Foundation, which, in keeping with their policy of initiating programs rather than sustaining them has already terminated.

Post-Graduate Division statistics for the academic year 1961–1962 can be analysed to give an estimate of the utilization of continuing medical education opportunities in the Atlantic provinces. With 9,528 attendances from a medical population of 1,528 there is an average of just over 6 attendance per doctor. Using the Dalhousie Refresher Course in Halifax as a basis because its attendance is estimated to be typical, 171 practitioners plus 43 residents (214 of 393 doctors in the area or approximately 55 per cent) attended this course in 1961. It is an observation that the same doctors attend repeatedly while others regularly stay away. Thus it is probable that the average doctor who *utilizes* continuing medical education opportunities in the Atlantic provinces can obtain at least 12 hours and probably 24 hours per year in the area. In the case of courses discussed in this Report the number of hours range from 12 to 30. This is far short of the 50 hours per year recommended by practitioners themselves and less than the 25 hours required annually to maintain membership in the College of General Practice of Canada unless the practitioner is in an area where one of the most intensive extramural regional courses discussed in this Report is available. Under these favorable circumstances he can barely meet the requirements of the College of General Practice of Canada.

In the belief that the present extramural regional course is, when ideally conducted with active case presentation and participation by the local practitioners in their community hospitals, the most effective form of continuing medical education, it is of interest to project the pilot experience at Dalhousie University and to estimate requirements for the provision of a minimum continuing medical education program of this type.

Basing the estimate on the present inadequate medical manpower of the four Atlantic provinces and allowing for an attendance of 65 per cent of the doctors and a higher than ideal attendance at individual meetings of from 20–24, a minimum of forty-six courses consisting of six meetings each would require to be established in strategically located community hospitals of the four Atlantic provinces. Although minor economies can be achieved by sending the teacher on a tour of five centres during a six or seven days absence from his regular duties, the extension of this regional course program into Newfoundland and its more adequate distribution over northern New Brunswick and the extremities of Nova Scotia would, by adding a high proportion of more expensive courses to the

group, leave the average cost per course essentially unchanged or somewhat increased.

Forty-six courses, it is estimated, would require 46 X 6 (meetings) X 2 (days of teachers time) or 282 teaching days, exclusive of necessary time by the teacher in preparing his material. In addition, a teacher must participate in under-graduate teaching, graduate teaching, clinical investigation and patient care to develop the experience and maintain the knowledge required to teach practising doctors, many of whom will be his seniors. Allowing as little as half the teacher's time for this, leaving one-quarter time for preparation of teaching material and one-quarter time for actual continuation teaching, staffing of a forty-six course program would require the Faculty of Medicine to be increased by the equivalent of eight full-time teachers while two additional full-time faculty members, devoting at least one-half their time to the planning and orga-nizing field trips for such a program, would be necessary.

Estimating that each of these forty-six courses would cost $1,200, a minimum budget for such program would be $55,200 plus the equivalent in salaries of from eight to ten full-time teachers – at least an additional $100,000 plus the cost of the University services (office and laboratory space, etc., used).

A regional extramural course type of continuing medical education is the most effective available means of maintaining a highly competent practising medical profession utilizing the best current procedures in patient care. It is for this reason an important community health service, returning immediate and con-tinuing benefits to the people.

THE FIRST ANNUAL REPORT OF THE DEPARTMENT OF CONTINUING MEDICAL EDUCATION, FACULTY OF MEDICINE, THE UNIVERSITY OF BRITISH COLUMBIA, FOR THE PERIOD JULY 1, 1960 TO JUNE 30, 1961

INTRODUCTION

This First Annual Report of the Department of Continuing Medical Education of the Faculty of Medicine, The University of British Columbia, records not only the principal activities of the Department during its first year, but as this natal year marks the formal starting point of the Department's life, the Report retrospectively reviews some of the important factors leading up to its establishment on July 1, 1960, and also looks forward to its ultimate goal of improved community health and to some of the events planned to achieve this objective.

The Report will deal with the impressive, growing post-graduate activities of the medical profession in British Columbia over the years and the recommen-dation of representative medical groups to the University that a Department of

Continuing Medical Education be created. It will refer to Dean John F. McCreary's statement of the three-fold purpose of the Department and the practical implications of this tripartite function involving, as it does, in a comprehensive, co-operative, educational effort to meet community health care needs, all health workers, including not only physicians, but also the valued allied professional and paramedical technical groups. The Report will relate the main features of the task of organizing the new Department, including travel to United States centres of continuing medical education, the preparation of a draft organizational "blueprint", preliminary liaison with University Extension, and with medical and health groups, and finally, financial considerations.

HISTORICAL BACKGROUND

It seems appropriate to begin this First Annual Report with a brief account of some of the main features of the historical growth of continuing medical education in British Columbia prior to the formal entrance of The University of British Columbia into this field of medical educational endeavour. Although it is difficult to assess the amount of physician self-education through reading and association with medical colleagues very considerable as it has undoubtedly been, the extent, however, of self-motivated learning by physicians in British Columbia as measured by the number of scientific meetings and 'refresher' courses has shown a growth that reflects great credit upon the medical profession and hospitals of the province; and this achievement is particularly noteworthy, because prior to 1950, in this large provincial area of 366,000 square miles, there was no Faculty of Medicine as in other comparable areas on this continent to provide the usual stimulus to post-graduate education that Faculties of Medicine have provided elsewhere.

The exact date of the beginning of continuing medical education in British Columbia is difficult to determine precisely. One early event, however, does stand out. In 1923 the Vancouver Medical Association began its first of a long series of annual Summer Schools. The B.C. Medical Association, to become, in 1950, the Canadian Medical Association, B.C. Division, over the years fostered education through its annual scientific meetings and by the President's tours of the non-metropolitan areas of the province. These were the principal earlier continuing educational programmes.

As elsewhere on this continent, with the end of World War II the educational needs of physicians returning to private practice, coupled with the explosive increase in new scientific and medical knowledge, stimulated a rapid expansion of the educational activities of medical societies and hospitals in British Columbia. Adding powerful impetus to this post-war expansion were two important national forces in Canada, – the Royal College of Physicians and Surgeons of Canada in the field of specialty practice, and the relatively young College of General Practice of Canada in the field of general practice. Each with its respective requirements for qualification stimulated the organization of educational programmes in the province. The Council of the College

of Physicians and Surgeons of B.C. continued through the authority of the Medical Act, to influence intern education by its regulations pertaining to registration to practise.

In 1950, the Faculty of Medicine of the University of British Columbia began teaching undergraduate students. This new teaching resource began immediately to enrich existing programmes of post-graduate medical education, enabled the expansion of others, and generally modified favourably and invigorated the entire professional educational field in the province. This Faculty contribution was not a formal one, but rather involved the provision of teachers and other facilities upon invitation.

By 1959, the trends and forces referred to above had produced a very substantial teaching-learning effort among the 2,100 physicians practising in British Columbia. It included 6 hospitals in junior intern training, 13 in resident training for 20 specialties, and 4 which provided residency programmes for general practice. There were numerous scientific meetings, including those of the C.M.A., B.C. Division and its Sections, those of the specialty societies, the local medical societies, such as the Vancouver Medical Association, the Victoria Medical Society, and district meetings at Kamloops, Upper Vancouver Island, West Kootenay, and in other areas. Finally, there were the post-graduate programmes of the Vancouver General Hospital, St. Paul's Hospital and that of the Department of General Practice of St. Vincent's Hospital.

Essential, valuable and praiseworthy as this tremendous effort had become by 1959, its very magnitude and complexity brought with it growing problems inherent in its growing size. These were related to lack of overall planning, to scheduling conflict, and to emphasis on lectures with a contrasting dearth of opportunity to learn new skills. The programmes tended to be centered in metropolitan areas with a relative neglect of regional community learning opportunities, a situation based in part on factors of geographic inaccessibility and related to the high cost of regional programmes. This is a record of a few of many problems which became increasingly apparent.

ESTABLISHMENT OF THE DEPARTMENT OF CONTINUING MEDICAL EDUCATION

These, then, were the circumstances and this the general situation which played an important part in the establishment of the Faculty of Medicine's Department of Continuing Medical Education. Several times during 1959 and 1960, a group representing medical organizations and hospitals active in post-graduate education for physicians in practice, met to consider a solution to the problems created by the rapidly expanding, 'piece-meal', unco-ordinated growth of the overall provincial effort. This group represented the C.M.A., B.C. Division, the Vancouver Medical Association, the Vancouver General Hospital, St. Paul's Hospital, the B.C. Chapter, College of General Pactice of Canada, the Medical Division of the Alumni Association of U.B.C., and the Faculty of Medicine. As

a result of the deliberations of this group the respective organizations and hospitals represented by the groups unanimously recommended through Dean McCreary to the Board of Governors of The University of British Columbia that there be created, within the Faculty of Medicine, a Department of continuing Medical Education, to assume responsibility for co-ordinating and assisting all post-graduate medical education in the province.

This recommendation was viewed with favour by the Board of Governors and on July 1, 1960, the new Department was established. In announcing this twelfth Department of the Faculty of Medicine, Dean McCreary charged the Department with the challenging task of organizing and administering a comprehensive new educational venture with a three-fold purpose:

1. To assist hospitals in intern-residency education, to increase medical enrolment in the Faculty of Graduate Studies, and to provide courses for the Fellowship and Certification of the Royal College of Physicians and Surgeons of Canada.
2. To integrate and expand the present programme of post-graduate education for physicians in practice.
3. To co-ordinate medical post-graduate education programmes with those of allied professional and technical groups in the health field.

Within the organizational structure of the Faculty of Medicine, the new Department of Continuing Medical Education assumed equal academic status with that of the basic medical and the clinical sciences departments, functioning closely with the Dean's administrative area, and being administered by a full-time Head with full professorial rank. It was indicated that the Department of University Extension would be closely associated in the comprehensive effort envisaged.

Although it will be referred to later in this Annual Report, it is appropriate to record here as well the initial impetus given to the establishment of the Department by the generous grant of $60,000 provided by the W.K. Kellogg Foundation. The provision of this valuable aid gave assurance of financial stability during the early formative period of the Department's growth.

COMPREHENSIVE PURPOSE AND CONCEPT OF CO-OPERATIVE EFFORT

Although the immediate educational purpose of this new University venture is to stimulate, co-ordinate and expand the acquisition of new knowledge and new skills in the medical component of the large and growing health care team in British Columbia, the Department will provide an educational focal point of co-operative association in educational partnership, not only of the medical profession, health departments and hospitals, but also of all health workers – the allied professional and paramedical technical groups – all of whom, individually and as an integrated team, have as their ultimate goal the attainment in the provincial community of British Columbia of the World Health Organization's

concept of health – "a state of complete physical, mental and social well-being" – which is the right of all persons.

The term "continuing medical education" is a relatively new one evolving from the term "continuing education", a dynamic synonym for "adult education". It is generally considered to mean "post-graduate medical education", that is, the teaching-learning process as applied to the physician in practice. More specifically, it is used for organized, non-credit, short courses and similar programmes of medical instruction. At The University of British Columbia, however, 'continuing medical education', in keeping with Dean McCreary's statement of the Department's three-fold purpose, is interpreted as meaning the full sweep of educational activity of a physician from the moment of graduation onwards during active professional life, – and chronologically includes graduate activities of all types, beginning with internship, extending to residency training, to study for higher academic degrees, and thereafter the wide and varied spectrum of lifelong, non-credit, post-graduate learning of the physician in practice.

The Department's responsibility does not stop at this point, however, but seeks to apply the amalgam of continuing education to accomplish a closer association of all health workers in the common task of improving the community health care, and in this context the term "continuing *health* education" might be more apropos. "Continuing" is the dynamic keyword. It implies that the medical education of physicians, and the health education of professional and technical workers in the health field, does not cease abruptly with graduation or technical qualification, but "continues" throughout life as a self-motivated enlightenment which it is the purpose of the new Department to encourage and assist.

ORGANIZATION OF THE DEPARTMENT

Having determined the Department's objectives, how to attain these became the next question. What form should the organization of the Department take? Upon what principles should its administrative functions be based? How long would it take to produce an efficient, full scale programme? These and many other questions pertinent to organizing the Department had to be answered.

It was estimated that a three year period would be required to create a programme as broadly conceived as that envisaged by Dean McCreary, the first year being devoted to laying the organizational foundation, the second to erecting the administrative structure and operating a few selected pilot courses, and the third year to the operation of a full trial programme both on a "medical" and on a "health" field basis. Thereafter it is intended that the annual programme will assume a character determined by the needs of the community with respect to good medical and health care.

From the foregoing, it is apparent that this First Annual Report deals with the "foundation" year of the Department of Continuing Medical Education, during which three major preparatory steps were taken, – the study of selected

successful programmes in the United States, the preparation of a draft Organization Chart, and the initiation of liaison with University Extension and the numerous medical and health groups with which the Department would ultimately be associated.

FINANCIAL CONSIDERATIONS

In the final analysis, the success of the Department of Continuing Medical Education in attaining its objectives, will depend upon its programme fulfilling an essential community need; as well as upon its ability to realize the funds necessary to maintain and expand its co-operative continuing health education effort. To initiate a programme of the magnitude envisaged and to accelerate it into full motion will probably be a five-year undertaking, the first three of which will require substantial financial subsidy and support. It is agreed that the overall operation of the programme of courses must become self-supporting as soon as possible. However, much of the Department's responsibility lies in non-revenue producing areas as the Organization Chart shows, and during the first two years this will be particularly so.

During the year 1960–1961, the sources of financial support were The University of British Columbia, the W.K. Kellogg Foundation, and the National Health Grants of the Department of National Health and Welfare. To funds from these sources will be added during 1961–1962, with progressive annual increases thereafter, fees from the courses offered.

Referred to earlier in this Report, and again gratefully acknowledged, is the generous $60,000 grant of the W.K. Kellogg Foundation, which constitutes a substantial part of the financial assistance during the first three years and which will continue with progressive reduction during the fourth and fifth years as the University undertakes to increase its basic administrative support proportionately as the Foundation aid is withdrawn.

Special mention should be made of financial help for specified educational projects made available from the National Health Grants, an example of which, during the past year, was the grant of funds for the study-tour to United States centres recorded in an earlier section of this Report. It is anticipated that in the large area of continuing health education involving public health personnel, other allied prefessional health workers and paramedical technical groups, application will be made within the terms of the Grants for substantial programme subsidy as specific courses are developed. For funds already received and for those anticipated, the Department is grateful to the Department of National Health and Welfare, and hopes that in the fulness of time, the assistance provided under the National Health Grants will, like bread caste upon the water, return to the taxpaying members of the community and their families in the form of increased health and a more abundant life.

Exhaustive preparatory study was undertaken to determine the financial policy of the Department of Continuing Medical Education with respect to drug

manufacturer subsidy for continuing medical education in British Columbia. Travel study to United States centres indicated that the drug trade, as a readily available source of substantial funds, was being viewed and reviewed by other universities and medical organizations with anxiety and concern from the standpoint of the ethics and the public reaction involved in the acceptance of funds which are now clearly recognized to be only a part of a much larger, complex, ingenious, and in some respects, devious drug sales promotional 'quid pro quo' device, a fact clearly documented in the Association of American Medical Colleges' Journal of Medical Education in the lead article on "Selling Drugs by 'Educating' Physicians" by May, in the January 1961 issue, in which this device is dissected in detail and its pathology clearly exposed to professional and public view.

In reaching a policy decision, the Department of Continuing Medical Education posed two questions — one ethical and one general.

Is it ethical for the continuing medical education of practising physicians to be subsidized by drug sales promotion funds, these funds being the profits of the sales of drug products ordered by physicians for patients entrusted to their care, the transfer of which funds either directly to physicians or indirectly through an intermediary such as the Department of Continuing Medical Education constituting both a 'rebate' to physicians, derived from the retail price paid by their patients and also a 'quid pro quo' sales promotion device for the drug manufacturer which is designed to place physicians under a sense of obligation to the manufacturer thereby influencing physicians' choice of therapy for their trusting patients?

Should sales promotion funds of drug manufacturers be received by the Department of Continuing Medical Education to support its educational programme for practising physicians in the province of British Columbia?

The carefully studied answers to these questions constitute a statement of the Department's financial policy on the matter of drug manufacturer promotional subsidy and is as follows:

> The recorded annual income of practising physicians in Canada is such that, provided the quality of the programmes of the Faculty of Medicine arranged by the Department of Continuing Medical Education for the practising physicians in British Columbia effectively meets the educational needs of the physicians, the financial operation of the Department's programme will not require financial subsidy from drug manufacturers, nor would the receipt of such subsidy be desirable on ethical grounds, nor from the standpoint of the potential jeopardy of the Department's present position of trust and respect in its relations with the medical profession and the public of the province.

APPENDIX 6

LIBRARY RESOURCES FOR MEDICAL EDUCATION AND RESEARCH IN CANADA

Early in 1961 The Library Committee of the College of Medicine, University of Saskatchewan, approached the Medical Research Council of Canada concerning the possibility of relating financial support of medical libraries in the universities to the awarding of grants for medical research. After discussion with the deans of medicine the M.R.C. suggested that the Association of Canadian Medical Colleges convene a meeting to discuss the problems of the medical libraries particularly in the face of great expansion of research in virtually all of the medical schools. This was held in the National Research Council building in Ottawa on February 9, 1962, under the chairmanship of Dean C.B. Stewart, President of ACMC. It was attended by representatives from all 12 university medical libraries, the Canadian Library Association, and the library of National Health and Welfare, the Dominion Archivist, the Librarian of the National Research Council of Canada, the President of the Medical Research Council of Canada and a representative of the Medical Education Project of the Royal Commission on Health Services.

The needs of the medical libraries were presented by their librarians, who also organized themselves that day as the Committee on Medical Science Libraries of the Canadian Library Association. It was agreed by all that more fact finding was necessary before corrective measures could be formulated. A survey should be made preferably by a senior librarian with experience in special libraries. A logical person to do this was Miss Beatrice V. Simon of Montreal[1] who was later appointed by a steering committee composed of officers of the newly founded Committee on Medical Science Libraries of the Canadian Library Association and of ACMC, along with a representative of the Medical Education Project of the Royal Commission on Health Services. McGill University granted Miss Simon four months' leave to make the survey and the universities provided the bulk of necessary financial

[1] Simon, Miss B.V., Assistant Librarian, McGill University; author of *Survey of Medical Library Facilities in London for Post-Graduate Students and Research Workers, Including a Suggested Scheme for the Re-organization of the Library of the Royal College of Surgeons of England*, London, 1938.

support. Further encouragement was received when the medical librarians presented their brief to the Royal Commission on Health Services.[1]

The actual survey visits were completed by September 1962, but much additional data had to be obtained by correspondence. The report[2] will be published early in 1964 by the Association of Canadian Medical Colleges through the facilities of the Canadian Universities Foundation. The factual data will all have been checked by the 12 universities surveyed but the conclusions and recommendations will be those of the author. Only the concluding sections of the report are reproduced here. See Chapter 12 for conclusions of the Medical Education Project group.

SUMMARY

1. Burgeoning research programmes, changing methods of teaching, post-graduate study, and continuing education programmes have greatly increased the numbers of those who must be served in the libraries of Canada's medical colleges; demands for materials and services have been created which most libraries are unable to supply. Efforts of administrators have been directed mainly towards obtaining additional funds for more research, for new buildings, and for technical equipment; the needs of the libraries have been almost entirely overlooked. As a result, the library support of Canada's medical education and research programme is insufficient for present needs and signs are not wanting that future demands will be greater than ever before.
2. There is a serious lack of library support in the teaching hospitals; although the entire clinical programme has moved into the hospitals, only 11 of the 61 official teaching hospitals maintain organized libraries administered by professional librarians. Research fellows and post-graduate students with grants for clinical research are hampered in their work by this lack: during their clinical years, the majority of Canadian medical undergraduates do not have immediate access to good clinical collections with which to supplement bedside teaching; the opportunity for acquiring desirable lifetime habits of reading and study is lost. Recent studies emphasizing the urgent need for continuing education for medical practitioners point up the fact that, if not acquired during this training period, such habits are not likely to be developed in later years.
3. The findings of the survey of library collections confirm the general feeling of the medical librarians that the world's output of medical literature has not been collected systematically in Canada and that present library acquisition programmes are not keeping pace with accelerating programmes of medical education and research. Important source materials in fields newly opening up are often missing, and there is sometimes little or no coverage in older fields where it might reasonably be expected to find at least the primary source materials. Depression era budgets have, in many cases, caused serious gaps

[1] Canadian Library Association, Committee on Medical Science Libraries, brief presented to the Royal Commission on Health Services, Toronto, 1962. (Hearing, May 10, 1962).

[2] Simon, B.V., *Library Support for Medical Education and Research in Canada, op. cit.*

in collections which can now be met only through recourse to inter-library borrowing. Holdings in only two libraries approach the size now generally accepted as necessary for the support of an expanding programme of graduate teaching and research.

4. The number of current serials received regularly in all but two libraries falls below the suggested minimum standards; the combined lists of all 12 libraries do not cover the journals indexed in *Index Medicus* and no library can offer more than 50 per cent of the subject coverage represented by that list, while three have less than 20 per cent. Although all libraries have access to additional titles in other libraries of the university, the number of these is relatively small and alters this percentage very little; inter-library borrowing of current journals has become excessive in some instances.

5. Success or failure of the teaching and research programme is just as dependent on good medical information service as it is on good laboratories and equipment. Although well aware of the necessity for improved and expanded services, few libraries are able to institute even a small number of these. Five libraries only have a reference librarian on the staff in addition to the chief medical librarian. Bibliographic service, translations service, and complete bibliographic control of the resources of the university in bio-medical fields are the means by which the library can provide access to the materials held locally, but only by recording all holdings of such materials in a national union catalogue of biomedical materials will the total resources of the country be made available, and the strengths and weaknesses of the collections disclosed.

6. Adequate library support of the education programme includes provision for training students in the use of libraries and the sources of published information. In Canada, library orientation programmes are not yet an established feature of all secondary schools; at the college level they are apt to be informal and brief. Introductory instruction at the pre-medical level is essential; a formal programme of lectures on medical bibliography and preparation of the research paper, developed by members of the faculty in co-operation with the medical librarian, should replace present informal and time-consuming efforts of librarians to provide the necessary instruction on an individual basis.

7. The facilities of all libraries are strained to the utmost by the increasing demands being made upon them. Working space for the staff is often so limited, or so badly planned, that necessary library operations cannot be carried on efficiently. In all but one new library, just recently opened, seating capacity is inadequate, stacks are overcrowded, and there is insufficient room for future expansion. Modern equipment, and the mechanical devices which would contribute to the efficiency of the staff are either lacking or available only at service points that are located at some distance from the medical library.

8. In planning new libraries, more attention should be given to the efficient use of space. The changing needs of medical undergraduates and the increasing numbers of post-graduate students require special attention. Warnings clearly stated in the report of a survey of 50 years of medical library planning in

the United States appear to have been overlooked. In 17 libraries built in that country since 1955, and in operation for two or more years, the chief errors have remained; insufficient space for current periodicals, insufficient work space, and uninformed planning. Specifications for some new medical libraries in Canada may not provide sufficient room for inevitable expansion; libraries which must compete with departments eager for additional laboratory space in new medical science buildings are in a particularly difficult position.

9. The design of a library service to meet the specialized needs of diversified groups with overlapping interests requires a new and objective approach to medical library organization; three significant trends have been noted: (a) creation of a large, centralized science library whose scope includes the physical as well as the biological and medical sciences; (b) establishment of a separate, health sciences library to provide materials and services to all faculties, schools and departments in related health fields and the life sciences; (c) development of the medical college library as the central research library in this group, and organization and support of branch libraries wherever needed. This achieves complete bibliographic control, while allowing maximum bibliothecal access to materials through a decentralized and specialized information service.

10. Most of the libraries are understaffed and should be strengthened by the addition of assistants in both professional and non-professional categories; librarians with language qualifications and new skills that will enable the library to take advantage of new methods of mechanical storage and retrieval may be needed in the future; service by regular members of the library staff during all hours of the day and evening when the library is open is now necessary.

11. All libraries are operating on budgets that are completely unrealistic in relation to the needs of research. Not one of the six complete budgets reported in the survey meets accepted standards for operating budgets; capital funds for building collections are not budgeted for regularly. Financial support of the library service should be proportionate to the teaching budget of the medical college and to the research budget.

12. Considering the size of Canada's population and its financial limitations, it would be unwise to attempt to create a new national library of medicine. Better results will be attained by building a nation-wide co-operative service based on existing medical and health science libraries. A country-wide plan for co-operative medical library service should include: (a) measures for strengthening existing medical college libraries and assistance for new libraries as they come into being in the future; (b) the development of a strong and well-organized regional library service; (c) creation of some form of national organization which would initiate and develop co-operative undertakings necessary to the successful operation of all the medical libraries.

13. The governing factor in the choice of a location for such a national organization is the need for it to be associated with a large collection in the field of its interests. This library should be developed as the central reservoir collection for Canada; minor regional reservoir collections should be created in appropriate medical college libraries, and an auxiliary library service organized in each region to serve the needs of medical practitioners, other health professionals, and hospitals.

14. There is a serious lack of qualified medical librarians in Canada as elsewhere. To meet this need, a programme of advanced study in medical bibliography and medical library administration should be instituted at an accredited library school where there is already a post-graduate programme leading to a higher degree in Library Science and ready access to a medical library of the requisite size and scope.

CONCLUSIONS[1]

Proposals for a nation-wide programme for improving access to the resources of medical information in Canada which might be considered are:

1. That a National Medical Bibliographic Centre and Information Service be established in the very near future;
2. That the Library with which the National Medical Bibliographic Centre is associated be developed as the main "reservoir library" for Canada to serve in lieu of a national medical library;
3. That a programme of financial aid to the 12 medical colleges now in existence, and to new ones as they come into being, be instituted so as to enable them to bring their collections up to standards and to develop them to the extent that is necessary to provide collective and systematic coverage in Canada of the current medical literature needed for medical education and research;
4. That the local agencies representing groups of health practitioners in each province be given financial assistance, on a matching basis, in establishing and maintaining an auxiliary province-wide library service for the benefit of their members as part of continuing education programmes, and as units in a nation-wide co-operative plan for medical library service;
5. That medical libraries which meet professional library standards be set up in every teaching hospital in Canada, either as part of a provincial medical library service, or in co-operation with the medical college using the hospital;
6. That a pilot programme for the training of medical science librarians at the post-graduate level of the Library Science Programme be instituted at an accredited Canadian Library School;

[1] Ibid.

7. That annual scholarships be established to enable librarians already working in medical libraries to enrol in summer courses in medical bibliography now available at library schools in the United States and, later, at Canadian universities;

The following might be considered for immediate action:

8. That a list be compiled of serials in medicine and related health science fields which are not at present held in any Canadian library but which should be available in the country;
9. That current and back files of these missing titles be acquired and placed in a library which can make them available throughout Canada by means of loans and photocopies;
10. That all holdings of serials in bio-medical fields be reported to the National Research Council Library for inclusion in the *Union List of Scientific Serials in Canadian Libraries;*
11. That the National Research Council Library include in its next edition of the *Union List of Scientific Serials in Canadian Libraries,* coverage of certain forms of serial publications not represented in former editions.

ESTIMATED COSTS OF A FIVE-YEAR PROGRAMME
TO ESTABLISH A NATION-WIDE SYSTEM OF MEDICAL LIBRARY SERVICE[1]

	Capital Grants	Annual Recurring
National Medical Bibliographic Centre		
To establish a bibliographic centre, a union catalogue, and a central reservoir library	$1,000,000	
Annual operating costs of the centre in succeeding years		$90,000
Financial Assistance to Medical College Libraries		
Annual grants of $30,000 to seven libraries for five years on a matching basis (under 30,000 volumes)	1,050,000	
Annual grants of $25,000 to five libraries for five years on a matching basis (over 30,000 volumes)	625,000	
Capital grants of $250,000 on a matching basis to five new medical colleges as they are established, for building collections	1,250,000	
Capital grants to help establish libraries in 54 teaching hospitals, and improve collections in those already established	2,000,000	
Annual grants to medical college libraries of $10.00 per student enrolled in medical and related health science courses (approximately 10,000 students enrolled in 1961/62)		100,000
Annual grants for library support of research programmes in medical colleges (10% of grants from public funds — approximately $4,000,000 in 1962/63)		400,000
Continuing Education of Medical Librarians		
Grant to establish the pilot programme over a period of three years	100,000	
Two annual scholarships of $300 each		600
Total	$6,025,000	$590,000

[1] Ibid.

APPENDIX 7

PROJECTIONS OF MEDICAL MANPOWER IN CANADA WITH VARYING PHYSICIAN IMMIGRATION AND ATTRITION

SUPPLY OF PHYSICIANS IN CANADA, 1961 – 1981

PROJECTION A: To 1961 count add intern classes from Canadian medical schools and 200 immigrant physicians (gross) annually; deduct 3.3 per cent annually for attrition, all causes.

Year	Number of Physicians	Intern Class	Immigrant Physicians	Less 3.3 Per Cent Attrition	Net Gain
1961	21,290	842	200	744	298
1962	21,588	853	200	755	298
1963	21,886	804	200	763	241
1964	22,127	825	200	772	253
1965	22,380	855	200	781	274
1966	22,654	930	200	793	337
1967	22,991	957	200	805	352
1968	23,343	1,009	200	818	391
1969	23,734	1,032	200	832	400
1970	24,134	1,032	200	846	386
1971	24,520	1,032	200	858	374
1972	24,894	1,068	200	872	396
1973	25,290	1,112	200	887	425
1974	25,715	1,125	200	901	424
1975	26,139	1,140	200	916	424
1976	26,563	1,147	200	930	417
1977	26,980	1,147	200	944	403
1978	27,383	1,147	200	958	389
1979	27,772	1,147	200	971	376
1980	28,148	1,147	200	983	364
1981	28,512	–	–	–	–

PROJECTION B: Add intern class from Canadian medical schools and 425 immigrant physicians (gross) annually; deduct 2.5 per cent attrition annually.

Year	Number of Physicians	Intern Class	Immigrant Physicians	Less 2.5 Per Cent Attrition	Net Gain
1961	21,290	842	425	564	703
1962	21,993	853	425	582	696
1963	22,689	804	425	598	631
1964	23,320	825	425	614	636
1965	23,956	855	425	631	649
1966	24,605	930	425	649	706
1967	25,311	957	425	667	715
1968	26,026	1,009	425	687	747
1969	26,773	1,032	425	706	751
1970	27,524	1,032	425	725	732
1971	28,256	1,032	425	743	714
1972	28,970	1,068	425	762	731
1973	29,701	1,112	425	781	756
1974	30,457	1,125	425	800	750
1975	31,207	1,140	425	819	646
1976	31,953	1,147	425	838	734
1977	32,687	1,147	425	856	716
1978	33,403	1,147	425	874	698
1979	34,101	1,147	425	892	680
1980	34,781	1,147	425	909	663
1981	35,444	–	–	–	–

PROJECTION C: Add intern class from Canadian schools and 300 immigrant physicians annually (gross); deduct 3.0 per cent attrition

Year	Number of Physicians	Intern Class	Immigrant Physicians	Less 3 Per Cent Attrition	Net Gain
1961	21,290	842	300	673	469
1962	21,759	853	300	687	466
1963	22,225	804	300	700	404
1964	22,629	825	300	713	412
1965	23,041	855	300	726	429
1966	23,470	930	300	741	489
1967	23,959	957	300	756	501
1968	24,460	1,009	300	773	536
1969	24,996	1,032	300	790	542
1970	25,538	1,032	300	806	526
1971	26,064	1,032	300	822	510
1972	26,574	1,068	300	838	530
1973	27,104	1,112	300	855	557
1974	27,661	1,125	300	873	552
1975	28,213	1,140	300	890	550
1976	28,763	1,147	300	906	541
1977	29,304	1,147	300	923	524
1978	29,828	1,147	300	938	509
1979	30,337	1,147	300	954	493
1980	30,830	1,147	300	968	479
1981	31,309	–	–	–	–

PROJECTION D: Add intern class (less 10 per cent for non-residents), net immigration of 100 physicians annually; deduct 1.5 per cent death rate annually

Year	Number of Physicians	Intern Class	Immigrant Physicians	Less 1.5 Per Cent Attrition	Net Gain
1961	21,290	758	100	332	526
1962	21,816	768	100	339	529
1963	22,345	724	100	348	476
1964	22,821	742	100	355	487
1965	23,308	769	100	363	506
1966	23,814	837	100	371	566
1967	24,380	861	100	380	581
1968	24,961	908	100	390	618
1969	25,579	929	100	399	630
1970	26,209	929	100	409	620
1971	26,839	929	100	418	611
1972	27,440	961	100	428	633
1973	28,073	1,001	100	438	663
1974	28,736	1,012	100	448	664
1975	29,400	1,026	100	458	668
1976	30,068	1,032	100	468	664
1977	30,732	1,032	100	478	654
1978	31,386	1,032	100	488	644
1979	32,030	1,032	100	497	635
1980	32,665	1,033	100	507	626
1981	33,291	—	—	—	—

PROJECTION E:

Annual increase in physicians due to projected output of Canadian medical schools (less 10 per cent for non-resident) and annual net immigration of 200 physicians, less deaths at 1.5 per cent

Year	Number of Physicians	Intern Class Less 10 Per Cent	Net Immigration	Deaths at 1.5 Per Cent	Net Gain
1961	21,290	758	200	334	624
1962	21,914	768	200	343	625
1963	22,539	724	200	352	572
1964	23,111	742	200	361	581
1965	23,692	769	200	370	599
1966	24,291	837	200	380	657
1967	24,948	861	200	390	671
1968	25,619	908	200	401	707
1969	26,326	929	200	412	717
1970	27,043	929	200	423	706
1971	27,749	929	200	433	696
1972	28,445	961	200	444	727
1973	29,162	1,001	200	455	745
1974	29,908	1,012	200	467	745
1975	30,653	1,026	200	478	748
1976	31,401	1,032	200	490	742
1977	32,143	1,032	200	501	731
1978	32,874	1,032	200	512	720
1979	33,694	1,032	200	522	710
1980	34,304	1,033	200	533	700
1981	35,004	—	—	—	—

PROJECTION F:

(a) Number of physicians contributed by annual immigration of 100, less death rate of 1.5 per cent, at five-year intervals.

(b) Number of physicians in Canada when augmented only by output of medical schools (less 10 per cent non-residents), less death rate of 1.5 per cent (derived from Projections D and E).

	Number of Physicians			
	1966	1971	1976	1981
(a) Projection E less Projection D				
Number due to 100 immigrants less deaths, 1.5 per cent	477	920	1,333	1,713
(b) D – (E-D)				
Physician population medical school output (less 10 per cent), less deaths, 1.5 per cent	23,337	25,909	28,726	31,570

PROJECTION G: Annual increase in physicians due to projected output of Canadian schools of medicine, 1961–1981 less an over-all attrition of 3 per cent annually. (No immigration; cf. Projection C)

Year	Number of Physicians	Intern Class	Less 3 Per Cent Attrition
1961	21,290	842	664
1962	21,468	853	670
1963	21,651	804	674
1964	21,781	825	678
1965	21,928	855	683
1966	22,100	930	691
1967	22,339	957	699
1968	22,597	1,009	708
1969	22,898	1,032	718
1970	23,212	1,032	727
1971	23,517	1,032	736
1972	23,813	1,068	746
1973	24,135	1,112	757
1974	24,490	1,125	768
1975	24,847	1,140	780
1976	25,207	1,147	791
1977	25,563	1,147	801
1978	25,909	1,147	812
1979	26,244	1,147	822
1980	26,569	1,147	831
1981	26,885	–	–

PROJECTION H: Annual increase in physicians due to projected output of Canadian schools of medicine, 1961–1981, less an over-all attrition of 2.5 per cent annually. (No immigration; cf. Projection B)

Year	Number of Physicians	Intern Class	Less 2.5 Per Cent Attrition
1961	21,290	842	553
1962	21,579	853	561
1963	21,871	804	567
1964	22,108	825	570
1965	22,360	855	580
1966	22,635	930	589
1967	22,976	957	598
1968	23,335	1,009	609
1969	23,735	1,032	619
1970	24,148	1,032	629
1971	24,551	1,032	640
1972	24,943	1,068	650
1973	25,361	1,112	662
1974	25,811	1,125	673
1975	26,263	1,140	685
1976	26,715	1,147	696
1977	27,166	1,147	708
1978	27,605	1,147	719
1979	28,033	1,147	729
1980	28,451	1,147	740
1981	28,858	–	–